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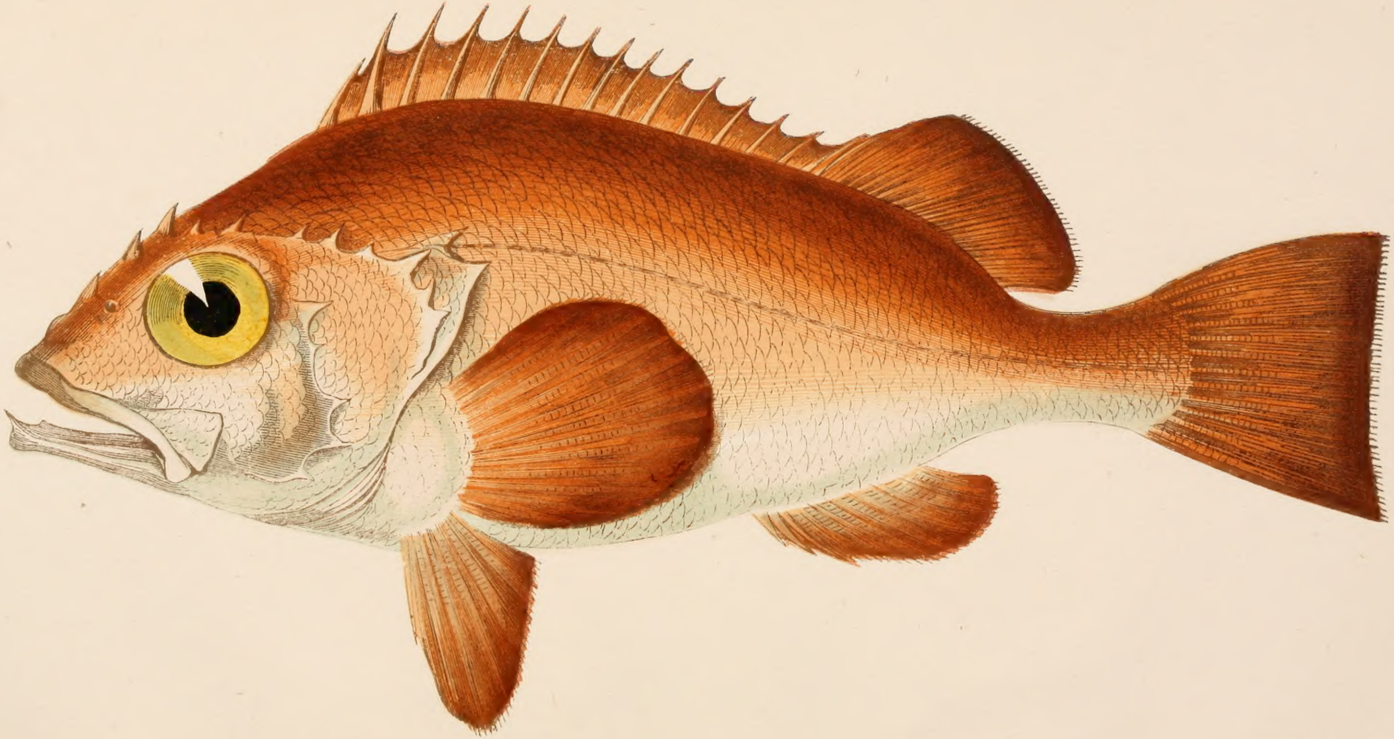

BERGYLT.

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A
HISTORY
OF THE
FISHES
OF THE
BRITISH ISLANDS.

BY JONATHAN COUCH, F.L.S.

VOL. II.

CONTAINING SIXTY-THREE COLOURED PLATES,
FROM DRAWINGS BY THE AUTHOR.

The works of the Lord are great, sought out of all them that have pleasure therein.—Psalm cxi, v. 2.

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M DCCC LXIX.

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FISHES OF THE BRITISH ISLANDS.

MAILED CHEEKS.

Cuvier says of this family of fishes, that it contains a numerous class to which the remarkable appearance of the head, variously armed and protected, gives a peculiar aspect which has always caused them to be arranged in special genera, although they have many close affinities with the family of Perches. Their common character consists in having the bone beneath the orbit more or less extended over the cheek, and articulated beneath with the first bone of the gill-cover. The teeth generally are fine. The pectoral fins in the whole of this class receive an extensive development, and are prepared for functions somewhat different from those exercised by the greater number of fishes; the separate rays of those fins being endowed with special powers of sensation, for the exercise of which they are supplied with nerves of more than ordinary size. The bones at the setting on of those fins are so arranged as to constitute what may be termed an arm, and the branches of the nerves pass along these bones, to proceed through an opening formed for that purpose between two of the bones, which may be called by the corresponding terms in the anatomy of man, the radius and ulna. The formation of the joints of these fins enables them to exercise extensive motion; and as in their more natural position, they are laid flat on the sides of the fish with a direction backward, those rays become the lowest which are most disengaged from their connection with others, and so answer more nearly to the human thumb and forefinger. In some instances they appear to assist in the motion of the fish whilst resting on the ground; on which or near it generally this family of fishes has its residence.

The species of this family are arranged among the Thoracic fishes, or such as have the ventral fins directly under the pectoral.

SEBASTES.

The head and body compressed, with scales which on the head proceed to or beyond the orbits; the back part of the head having a few small spines. The first gill-cover armed. The dorsal fin single, formed by a notch into spinous and soft divisions.

BERGYLT.

NORWAY HADDOCK.

Perca marina,	Linnæus.
Sebastes Norvegicus,	Cuvier. Yarrell; Br. F., vol. i, p. 87.
Holocentre Norvegien,	Lacepede.
Serranus Norvegicus,	Fleming; Br. Animals, p. 212.
Scorpæna Norvegica,	Jenyns; Manual, p. 347.
" "	Report of Natural History Society of Dublin, 1856-7.
" "	Gunther; Catalogue of Br. Museum, vol. ii, p. 96.

This fish is a native of the Northern Ocean, being found as far north as Greenland; and it is not uncommon on the coast of Norway. Its appearance in Zetland also cannot be regarded as strange, since it is sufficiently well known there as to have obtained a familiar name. The terms Bergylt, Norwegian Carp, and Norway Haddock, however inappropriate the latter may be as signifying a likeness to Gadöid or Cod-like fishes, are designations applied to it by fishermen of those islands. It scarcely appears by its form to be well fitted for extensive wandering; and yet several instances have occurred to shew that its visits to the British Islands are not uncommon. Pennant must have had authority for classing it among British fishes, and Dr. Fleming had seen an example in Zetland. The latter also reports its occurrence on the coast of Aberdeenshire;

and Dr. George Johnston observed it in the neighbourhood of Berwick. Mr. Gregor informs me of an example of one caught near Macduff, and another on the Morayshire coast.

In the north of Ireland it appears to be of even more frequent occurrence than in Scotland or England; or at least it has been more frequently observed there by naturalists; and the following account, which we extract from the Proceedings of the Natural History Society of Dublin for the Session 1856-7, will add several particulars to what was before known of its history:—"The first record of this addition to the ichthyology of Ireland was made by Mr. Andrews, Honorary Secretary, at a meeting of the Society held on the 4th. of May, 1849. Two fine specimens of the fish were taken in the month of March last, on the long lines set for Ling, in deep water off the Wild Bank, Dingle Bay, and brought in by canoe men in the employment of the Royal Irish Fisheries Company. Several specimens have since been taken in the same bay, and in the summer of 1850 two were taken, in eighty-one fathoms, off the Blasket Islands, coast of Kerry, on long lines set for Cod; one of which Mr. Andrews had for some hours alive in a tub of sea-water.

The Sebastes is an exceedingly active fish, voracious, and apparently of pugnacious habits. In the recent state its colour is very vivid, of a beautiful vermilion, the shades dark on the back, assuming a lighter tinge on the sides, and passing into a silvery white on the belly. The pectoral fins are large, of a bright red colour, as is also the caudal fin, the fins terminating in filaments. Mr. Gregor's specimen was yellow. The eyes were very brilliant, particularly large, and prominent. It is nearly connected with the Serrani in the ovate body, obtuse head, large eyes, and formation of the jaw; the jaws, head, and body being covered with rough scales. In the Faroe Islands it is very frequently taken in deep water when fishing for Cod; where it is termed Kongafisshur and the Red Perch."

In addition to the particulars given above from Irish authority, it is with pleasure I am able to add others of interest, which have been communicated to me by the kindness of W. Wheelwright, Esq., on Swedish authority; with the observation however, that the fish referred to as a variety, (and which appears to be the same of which some of the habits, as well as the description, are contained in the work of Lacepede, who says it attains to two yards in length,) may on examination prove to be a distinct species. The fins here referred to is known by the name of Hav Uez, and is twice as large as the more common Bergylt. They are believed to live together in considerable numbers, on stony ground, at the enormous depth of from one hundred to a hundred and fifty fathoms. Professor Nilsson, the eminent Swedish naturalist, informs us that not unfrequently very large numbers of them are found floating on the surface, dead or in a dying condition, with their eyes protruding from their head, and their entrails from their mouths; their violent death being ascribed to the circumstance of their having fallen in the way of some of those sudden whirlpools that occur at the bottom of the sea in these districts, of which the well-known maëlstrom is not the only example. The great difference of pressure to which they are exposed, by being thrust from the great depth of their ordinary residence to a much higher stratum of water, will account for the particular appearances attending their death. The young are produced in June; and it is confidently believed by the fishermen that they continue to accompany the mother for a considerable time. It is even supposed on good evidence that they proceed from the mother alive.

Fin rays—dorsal fifteen spinous and thirteen soft, pectoral seventeen, ventral one spinous and five soft, anal three spinous and seven soft, caudal fifteen.

COTTUS.

The head broad, depressed, rounded in front. Body compressed behind; head and body covered with a soft skin, without scales. Two dorsal fins of moderate height. Slight teeth in the jaws and front of the vomer. No air-bladder.

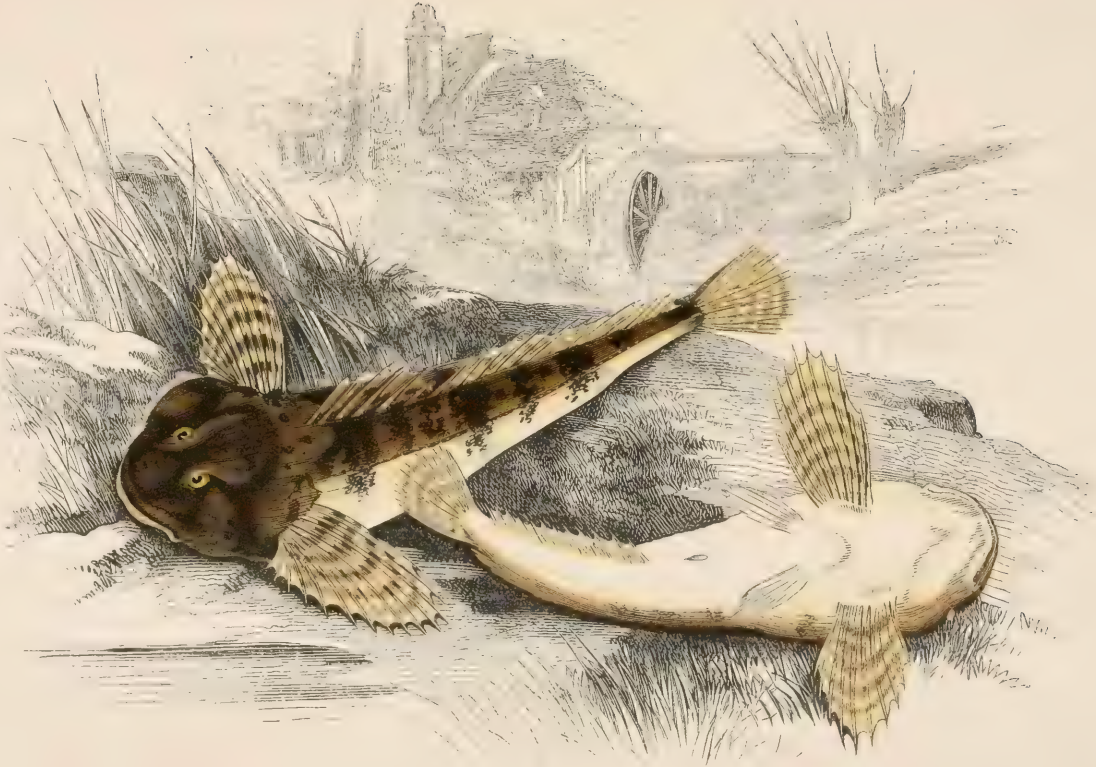
MILLER'S THUMB.

RIVER BULLHEAD.

Gobius capitatus,	Jonston; pl. 29, fig. 11.
" "	Willoughby; p. 137, Table H. 3, f. 4.
Cottus gobio,	Linnæus. Cuvier.
" "	Bloch; pl. 39, f. 2. Donovan; pl. 80.
" "	Lacepede. Fleming; Br. An., p. 216.
" "	Jenyns; Manual, p. 343.
" "	Yarrell; Br. Fishes, vol. i. p. 71.
Cotte chabot,	Gunther; Cat. Br. M., vol. ii, p. 159.

This little fish is well known in most of the gravelly streams of the United Kingdom, and is also found in the cooler districts of Europe and Asia, where it hides itself under stones, from which, in changing place or seeking its prey, it may rather be said to dart itself than to swim, so sudden and quick are its usual motions. Its food is the smaller animals of fresh water, the spawn of fish, and also the young ones in the early stage of their existence, whilst itself becomes the prey of the larger natives of the stream. As might be expected, it readily takes a bait, but its skin is so slippery as to glide through the fingers when an attempt is made to grasp it.

They are said to drop their spawn towards the end of March, and the manner in which this business is conducted has been differently described by different writers. Jonston,



MILLER'S THUMB

LIX

and after him Willoughby, represent the female as becoming much distended with spawn, which she collects into little lumps on her breast, where it is covered with a black membrane until it is hatched. One the other hand Linnæus says that she forms a nest on the ground, to which Fleming adds that it is made of a hole in the gravel, and there she broods over it until they are produced to life. Blumenback's representation is, that it keeps watch over its nest. This species retains life for many hours after it is taken from the water. It is esteemed as food in those countries where very small fishes are not disregarded.

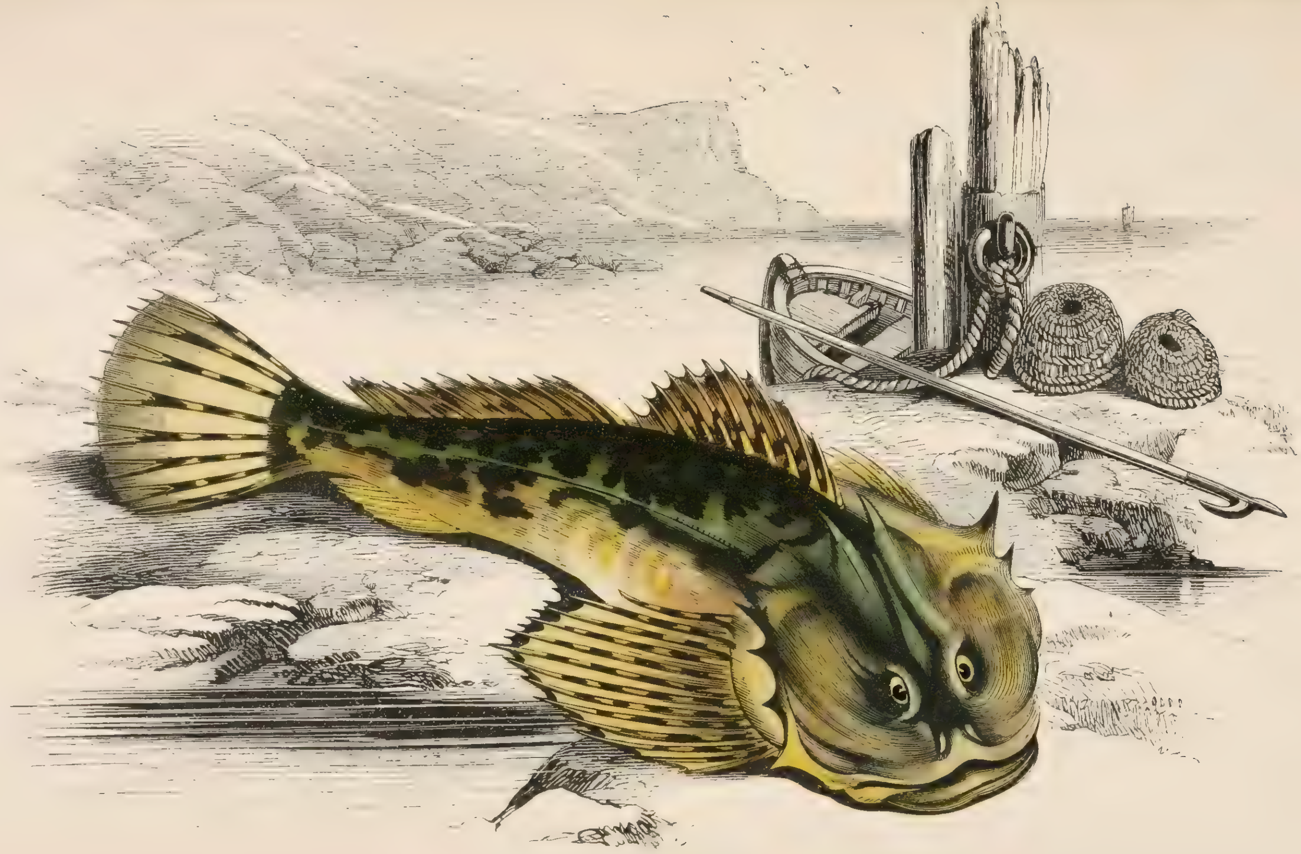
It grows to the length of three or four inches; the head large, broad, and depressed; the front round, swelling at the cheeks, with a crooked spine low on the gill-cover. Jaws equal, with very small teeth; eyes small, high on the head, with a depression obliquely before them. The body smooth, tapering from the origin of the first dorsal fin to the tail. The lateral line almost straight. The first dorsal fin begins a little behind the root of the pectorals, and is low, with an oval outline; the second dorsal near the first, and passing on close to the tail, which is round; anal fin not quite so long as the second dorsal; pectorals large, the rays bearing out the membrane; ventral fins small; the rays of all the fins soft and flexible. Colour, on a ground of dusky yellow, dark bands or spots, in which the fins partake; white below.

FATHER-LASHER.

STING-FISH. GUNDIE.

Scorpius marinus ater,	Jonston, (of the Edition of 1767,) table 47, f. 4, 5, but with no reference in the text.
Scorpœnæ Bellonii similis, A 12, *P* 145, *Father-lasher,*	Ray; Synopsis Piscium.
Cottus Scorpius,	Linnæus. Cuvier.
" "	Bloch; pl. 40.
" "	Donovan; pl. 35.
" "	Fleming; Br. Animals, p. 275.
" "	Jenyns; Manual, p. 344.
" "	Yarrell; Br. Fishes, vol. i, p. 75.
Chabot,	Lacepede. Risso.
"	Gunther; Catalogue of British Museum, vol. ii, p. 159.

This little fish is common on our coasts from Scotland to Cornwall, near the land; and although it does not usually suffer itself to be left uncovered by the tide, it for the most part keeps itself within a short distance of the lowest ebb: so as in summer to be often caught in the nets employed for taking prawns and shrimps. It devours the smaller crustaceous animals, and any other creature it is able to swallow. It is therefore always ready to take a bait; but when handled, or on the appearance of danger, it swells out its cheeks to protrude the spines with which they are armed, and so guard itself against the attack of formidable enemies. At this time also there may be felt such a trembling of the throat as might suggest the opinion that it proceeds from an effort to produce some sort of sound, that could be perceived in its native element.



FATHER-LASHER

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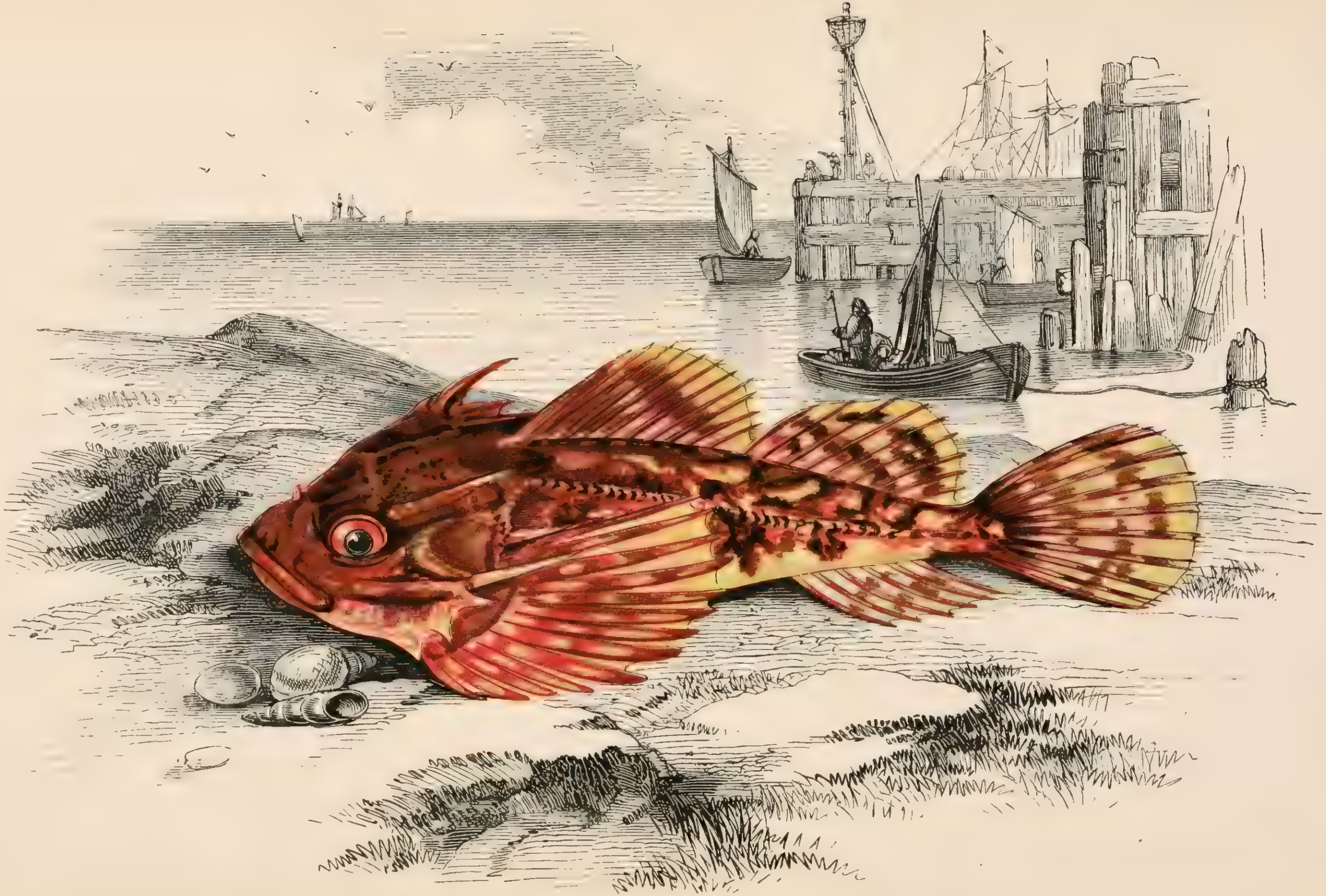
This species generally seeks concealment under the shelter of some stone or sea-weed, from which it passes out only in search of prey, or to change one situation for another. The season of spawning is probably spread over some distance of time in the spring, and I have seen the single grains of spawn with the embryo within them partly developed, as if scattered at random in pools of the rocks. When freed from the egg the young ones offer an example by which, perhaps, we may judge how some other smooth-skinned fishes obtain the development of their mottled colours. At their earliest stage the surface of the body is transparent; and the only visible coloured substance is the peritoneum, or lining of the cavity of the bowels. The colouring of the skin begins at the head, and is gradually continued backward in defined and separate bands, the intervals between each band continuing transparent for a longer or shorter time; and each of the succeeding dark bands at its formation is still paler than the next before it. The fins assume their colours last of all; and when the whole of the surface has become tinted, the alternate bands break into spots or circles by which the fish is ever after distinguished.

The Father-lasher, or Sting-fish, will live long out of the water, and the longer if its skin be kept moistened; but it is said to be quickly killed if dipped in fresh-water: a circumstance the more remarkable as its haunts are frequently in places where the fresh and salt-water mingle together. It is widely distributed in the seas of Europe; and besides the extreme limits of the British Islands it is found from the Baltic to the Mediterranean. With us, however, it is too insignificant to be employed as food.

It grows to the length of four or five inches; the head large, wide, and depressed; the eyes near each other, but directed laterally; and I have seen an example with a row of tendrils hanging from the skin above the eyes. A depression between the eyes, and two bony prominences before them. On the top of the head a lengthened channel; the gill-covers armed with sharp spines, one of which is long and sharp, covered with the skin, which the fish can in part withdraw, and cover it over again. The mouth wide, with teeth in the jaws and palate. The body rounded near the head, the belly protuberant, tapering towards the tail; a row of low spines along the course of the lateral line. Dorsal fins two, approaching each other; the rays of the first firm. Pectoral fins large, nearly round, the ends of the rays projecting; ventrals moderately extended; the tail round; the fin rays generally stout and soft. The colours dusky, often a dark green, and mottled; the belly pale yellow, white, or green.



BUBALIS.

LXI

BUBALIS.

LUCKY PROACH;

Confounded with the Father-lasher under the name of Gundie.

Cottus Bubalis,	Cuvier. Jenyns; Manual, p. 345.
" "	Yarrell; Br. Fishes, vol. i, p. 78.
" "	Gunther; Catalogue of Br. Museum, vol. ii, p. 164.

This species bears so near a resemblance to the Father-lasher, or Sting-fish, last described, that until very recent times they were confounded together; and for the purpose of distinguishing between them, it will be necessary to describe the Bubalis in comparison with the other, rather than independently and by itself. It is about the same size, but of slightly a more slender shape; head narrower and more rough; spines sharper and longer; snout somewhat more protruded; fins more developed; the second dorsal and anal carried nearer the tail. In colour the difference is considerable; the species now under consideration, although subject to some variation, being adorned with a mottled variety of brilliant red and brown, with bars of red or crimson across the pectoral fins and lips. The rays of the fins are often highly coloured when the connecting membrane is plain or colourless.

The habits of this fish, so far as they are known, appear to be different from those of the Father-lasher only in that it keeps in deeper water. It feeds on the smaller crustacean animals, and probably on very young fishes. As it is often taken in crab-pots, which are usually set in places where sand and low rocks are intermingled, we conclude that such are its favourite resorts; and that it enters those traps for the purpose of obtaining a meal from the baits they contain. In its turn it becomes a bait to entice the lobster and crab to a like captivity.

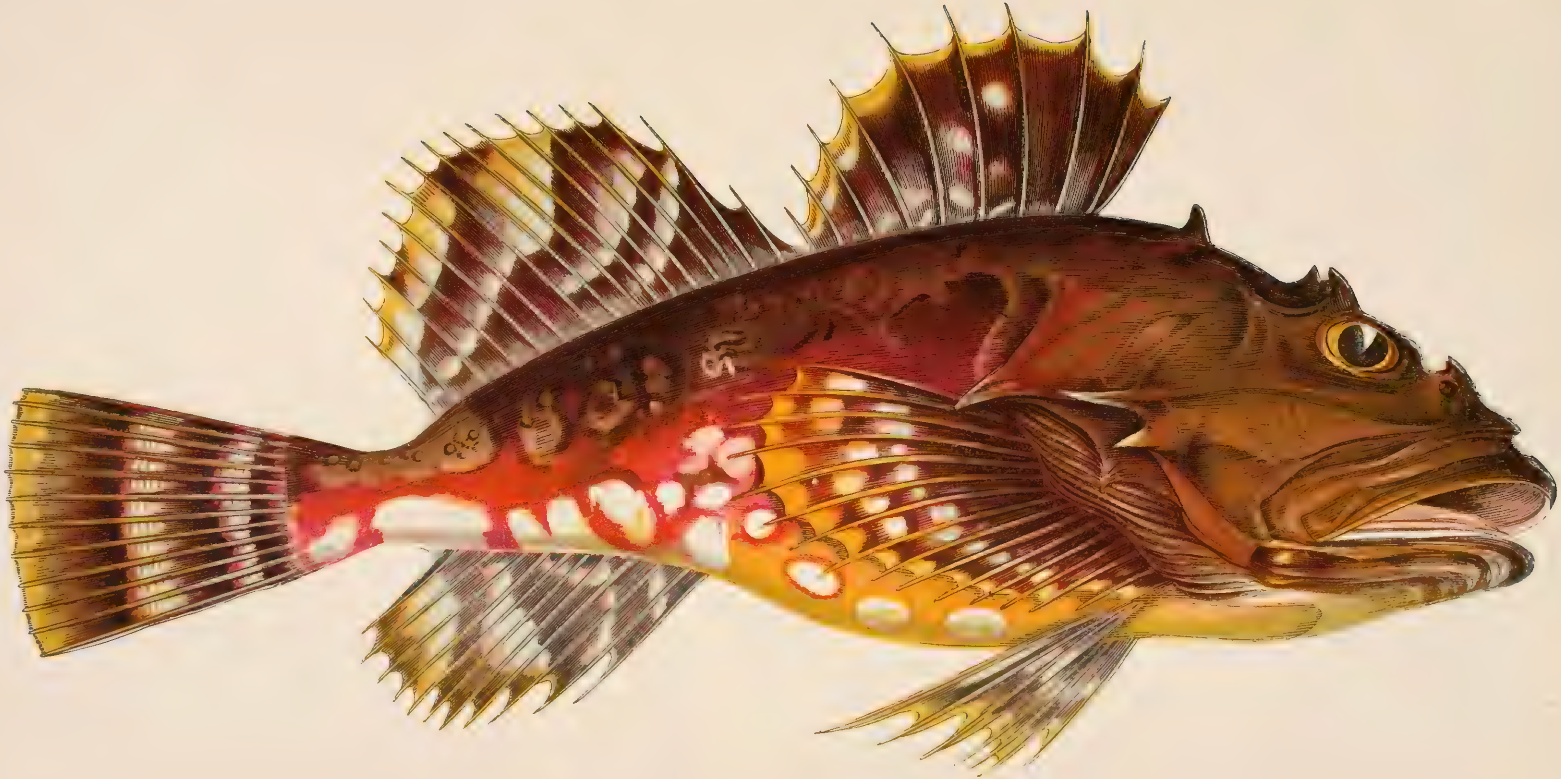
GREENLAND BULLHEAD.

SEA SCORPION. GREENLAND COTTUS.

Cottus Grœnlandicus,	Proceedings of the Natural History Society of Dublin, for the Session 1856-7, p. 61.
" "	GUNTHER; Catalogue of Br. Museum, vol. ii, p. 161.
" "	YARRELL; Br. Fishes, 2nd. Supplement by Sir John Richardson, p. i.

THIS is again a fish which was long confounded with the Common Father-lasher; and although its greatly superior size might have been sufficient to raise a doubt in the minds of observers of their being the same, the mistake has been corrected only in recent times. It is a native of the Northern Ocean, and is found on the American as well as on the European side of the Atlantic; but further to the south in the former, from the greater degree of cold that usually exists on the eastward than on the westward side of any continent.

No more than two instances are known of its having been taken in the British Islands; and both of these occurred in Ireland; of which we have the following account in the Proceedings of the Natural History Society of Dublin, above referred to. Our figure also is borrowed from the same source, but is closely similar to that which is given by Sir J. Richardson, from an American example:—"It was taken in Dingle harbour, County of Kerry, in the month of February, 1850, when drawing a sean for sand-smelts. Its beautiful and vivid colouring attracted the attention of Mr. B. Hilliard, Agent to the Royal Irish Fisheries Company, who, presuming it to be of rare occurrence, at once forwarded it to Mr. Andrews, the Manager of the Company."



GREENLAND BULLHEAD

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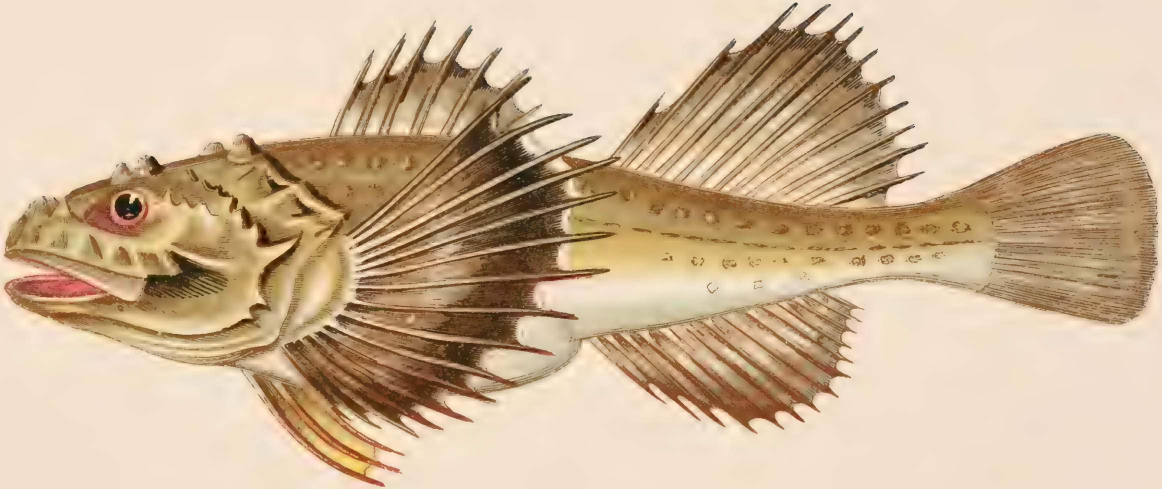
"The *Cottus Grœnlandicus* is admirably described in Richardson's 'Zoology of British America,' known as the Greenland Bullhead—the Kaniock and Kanininock of the Greenlanders. The colours of the specimen here figured were extremely beautiful—the shades of the head vandyke brown, the deeper umber beautifully glazed over with a pinkish or violet tinge, the dorsal and above the lateral line more or less shaded and spotted towards the tail, and leaving a line of numerous papillæ or tubercles (altogether absent in *C. Scorpius*) below the lateral line; large and irregularly formed white spots mark the sides, shaded around with deep carmine and a rich chocolate brown, the tinge towards the belly passing into rich orange; the belly is also marked along the line to the tail with a row of roundish white spots; pectoral fins beautifully shaded and barren, spotted with white, the terminal portion and margins of a rich orange, resembling and emulating in beauty the rich colouring of the tiger-moth; irides of a deep golden yellow, tinged and marked with orange. The posterior portions of the rays of the pectoral and ventral fins are rough, with ciliated or minute spinous processes, which seem to be characteristic, and are not present in *C. Scorpius* or *C. Bubalis*, the rays in those species being smooth on both sides."

Crantz, the historian of Greenland, who calls this fish the Sea Scorpion, says that its resort is in the deeper water of the bays of that country, where it is fished for with long lines; the bait being a white bone, a glass bead, or piece of red cloth; and that it is esteemed as food; being also sometimes employed as a material for soup.

I suppose it highly probable that the account which Lacepede has given us of the fish he calls Le Cotte Scorpion, and which in his day was judged to be the same with the Greenland Bullhead, was derived from observations that had been made on the habits of the last-named species; for they certainly will not apply to those of our more common Father-lasher. He says, in regard to its haunts, that they extend to both sides of the Atlantic, and so far north as to near the Arctic Circle. It is very active, and swift in the pursuit of prey, which it follows even to the surface; in which it differs from the generality of the fishes of this genus, but the fact is established on the evidence of later observers. Its victims are the blennies, herrings, cod-fishes, and even the salmon; and the last-named circumstance will become the less incredible if it be true that this fish reaches the length of two French metres, or about two yards. This author contradicts the remark of Crantz, as regards its excellency as food; but may be explained by the difference of taste between an inhabitant of Greenland and one accustomed to the luxuries of the metropolis of France.



FOUR-HORNED COTTUS

LXIII

FOUR-HORNED COTTUS.

Cottus quadricornis,	Linnæus. Cuvier. Bloch; pl. 108.
" "	Jenyns; Manual, p. 345.
" "	Yarrell; Br. Fishes, vol. i, p. 83.
Cotte quatrecornis,	Lacepede. Gunther; Catalogue of Br. Museum, vol. ii, p. 166.

This species is an inhabitant of the Baltic, and the Northern Ocean as far as Greenland; but it is only of late that it is known to be a native of our own country. It was first observed as British by Dr. John Edward Grey, of the British Museum, who communicated the circumstance to Mr. Yarrell; and it has since been noticed on the coast of Scotland, where probably it is not rare. It appears to be an active fish, eager after prey, for which it lies in wait under the shelter of the sea-weeds; but its peculiar habits have been little studied. Lacepede says it enters rivers, but it does not appear to be abundant anywhere.

In size it exceeds the Common Father-lasher and Bubalis, and is easily distinguished from either of them. The head is wide, flat, and, notwithstanding the tubercles or horns, smoother than in either of the above-named species. Jaws equal, and the gape not wide; teeth fine. Eyes moderately large, close to the top of the head, but with a flat space between them; the pair of nostrils on each side separate from each other. In front above the upper lip three tubercles placed triangularly. Behind the eyes two elevated tubercles, recurved, and a corresponding pair at the back of the head, having granulated tops. On the hinder portion of the gill-cover a sharp but not very prominent spine, pointing obliquely upward, and below it a shorter one directed backward; a third still lower, pointing downward. Body very wide over the back; belly much distended; behind the vent more slender, and especially so nearer the tail; the base of which expands where the caudal fin rises from it. The first dorsal fin rises behind the insertion of the pectoral, and is not very high. Second dorsal opposite the anal; both of them wide, and at a good distance from the tail, which organ is round. Pectoral fins wide, the lower rays passing up under the throat; the middle rays reaching beyond the termination of the first dorsal. Ventral fins small and separate. A row of low tubercles runs along the body, from the hinder elevated tubercle of the head to the tail; and a row of low spines runs parallel with this, but a little separated, to the end of the second dorsal; intermingled with several irregular tubercles at the side opposite this second dorsal.

It is probable that the colour of this fish varies as it is found in different districts; and the example which came to me in spirit from London, and for which I am indebted to the kindness of Dr. Gunther and Dr. J. E. Grey, was of a uniform light brown, mottled on the lips and gill-covers; upper ridge of the tail with minute spines.

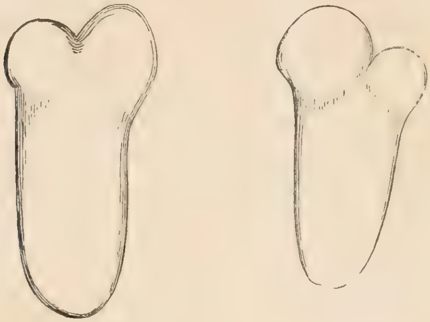
Fin rays—pectoral sixteen, first dorsal nine, second dorsal fourteen, ventral three, anal fifteen, caudal sixteen in all.

GURNARDS.

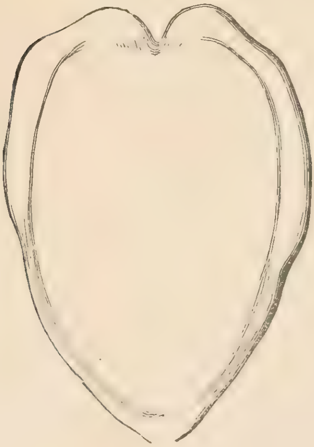
The fishes of this well-marked family have obtained their English name from the firm, rugged, and bony structure of their head: the word Gurnard being significant of this character in the ancient language of Britain. The summit of the head is high; and it slopes obliquely to the snout, which projects over the mouth in a double and jagged process. The eyes are on a level with the top of the head, and are directed laterally; the cheeks firmly fixed, and the gill-covers nearly so; the surface being bony, and studded with star-like lines, which are not covered with visible skin. Posteriorly they are armed with strong spines, which are rough, with raised lines; and one, of a flattened triangular form, is at the side of the body. The under part of the body is strengthened with a broad sternum or breast-bone. The dorsal fins two, the first with spinous rays; pectorals broad; but what particularly distinguishes this genus are the three separate slender processes on each side, immediately below the pectoral fins; which possess extensive motion on a double row of joints not connected with the fins. These processes or fingers are supplied with peculiar nerves, and consequently are in possession of special functions. That they are organs of feeling is not to be doubted; but the fish has also been seen, when resting on the ground, to close the pectoral fins, and to creep with an appearance of research by the help of those processes, as if they were organs of motion that could be employed without exciting alarm in the prey; which the motion of the fins might possibly do. All of these fishes are remarkably furnished with air-bladders, which vary in shape according to the species; but all of them are firm in texture, with muscular fibres interwoven with their fibrous texture, and are so loosely fastened to the back-bone, as to be capable of being removed from the body without the loss of the contained air. By this structure of the air-bladder the organ appears to be in some measure subject to the will of the fish, and also to be capable of sustaining the various degrees of pressure which it must encounter when these fishes rise, as they sometimes do, from a considerable depth in the water to the surface.

The fish of this family are placed by Linnæus in the Thoracic order.

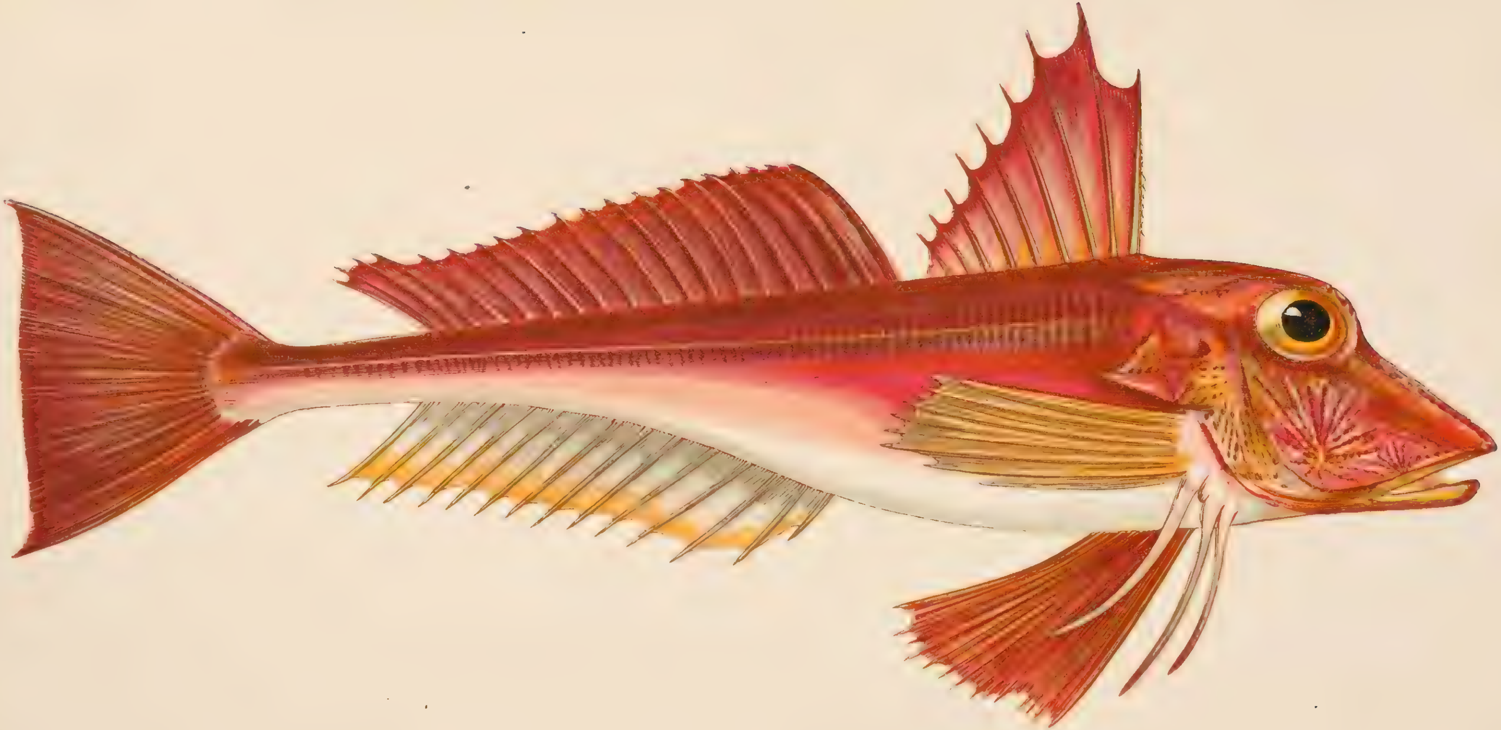
AIR-BLADDERS OF TRIGLIDÆ.



Red Gurnard. Grey Gurnard.



Tubfish.



ELLOCK.

LXIV.

ELLECK.

RED-FISH. SOLDIER. RED GURNARD. ROTCHET.

Lucerna sive cucullus,	WILLOUGHBY; p. 281, tab. s. 5.
Trigla cuculus,	ARTEDI.
" "	YARRELL; Br. Fishes, vol. i, p. 38.

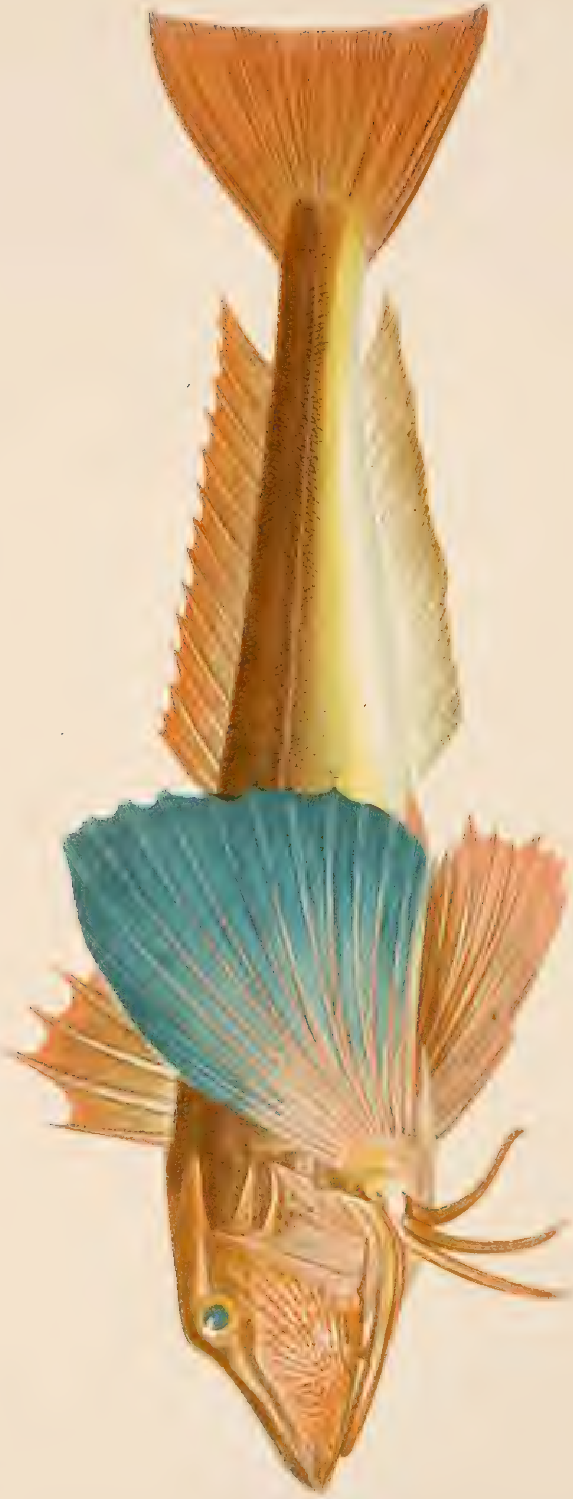
IN most writers there appears to be great uncertainty as regards this very common species; which, therefore, we must describe and represent from our own knowledge, with little reference to the authority of others. That the appearance and colour may vary on different coasts of the kingdom we can readily suppose; but the principal difficulty appears to have arisen from confounding it with a kindred species, which Bloch has given an account of under the name of *Trigla pini*, and which I suppose to be the same with Bloch's Gurnard of Mr. Yarrell.

The Elleck is caught on the west coast of England and Ireland at all seasons; and it is known also at the extremity of Scotland; where, however, as I learn from C. W. Peach, Esq., of Wick, it is in such little esteem as food, as for the most part to be thrown aside as worthless. In England they meet with a ready sale; and it is their smaller size only that places them lower than the Tubfish and Piper in public estimation. The usual habit of this species, as of the whole family, is to keep near the bottom in moderately deep water; and there they feed on shell-fish, crabs, and small fishes, with a variety of other creatures inhabiting the bottom of the sea. They also take a bait freely, but are caught in the greatest abundance with trawls. I have found them with spawn well developed at the opposite seasons of January, April, and June.

The Elleck is usually about a foot in length, but has been known to measure eighteen inches. The head is high, narrow on the summit, with a depression between the eyes, which, therefore, are close together; sloping thence to the snout, which is cut in on the front, and slightly divided, projecting over the mouth; teeth small and rather numerous. The body irregularly round, narrower on the back, and more slender towards the tail. Above each eye an obscure row of spines; behind the head a rough spine, another on the hinder gill-cover, and a third above the origin of the pectoral fin; a line of low tubercles runs along the side of the root of the rays of the dorsal fin; the lateral line rough from a series of obscure plates. The first dorsal fin with spinous rays, the first shorter than the second, and having a rough front. Pectorals scarcely reaching to the vent. Tail straight, except that sometimes the outer ray above and below is longest. The head, back, and sides, with the dorsal and caudal fins are a bright red, sometimes darker and sometimes dusky on the back, with occasionally a few golden spots. Pectorals, ventrals, and finger processes a paler red, tinged with yellow; anal whitish, tinged with red. Iris golden or orange yellow, with a circle of red or crimson.

An example of unusual size came under my inspection, that was so stout as to be thicker through its body than deep; the colours bright, with the back, head, and sides covered thickly with golden spots about the size of a large pea.

Fin rays—first dorsal nine, second dorsal eighteen, pectoral ten, (bifid,) ventral six, anal seventeen, caudal fan-shaped. The two last rays of the second dorsal and anal in some examples spring from one root.



TUBFISH.

Sapphirine Gurnard,	Willoughby; p. 280.
Trigla hirundo,	Linnæus; but there is an error in his specific character in assigning to it a spinous lateral line.
“ “	Donovan; pl. 1, but badly represented, especially in the head.
“ “	Fleming; British Animals, p. 214.
“ “	Jenyns; Manual, p. 340.
“ “	Yarrell; Br. Fishes, vol. i, p. 47; the head is represented too narrow.
“ “	Gunther; Cat. of Br. Museum, vol. ii, p. 202.
Trigla hirondelle,	Lacepede. Risso. Bloch; pl. 60.

The name of the household vessel, a tub, is derived from a word which signifies short and thick, and of which the word tubbot, frequently used in the west of England, is the adjective. This, beyond doubt, is the origin of the common name of this fish, which is the thickest, and comparatively, therefore, the shortest of the species of this genus.

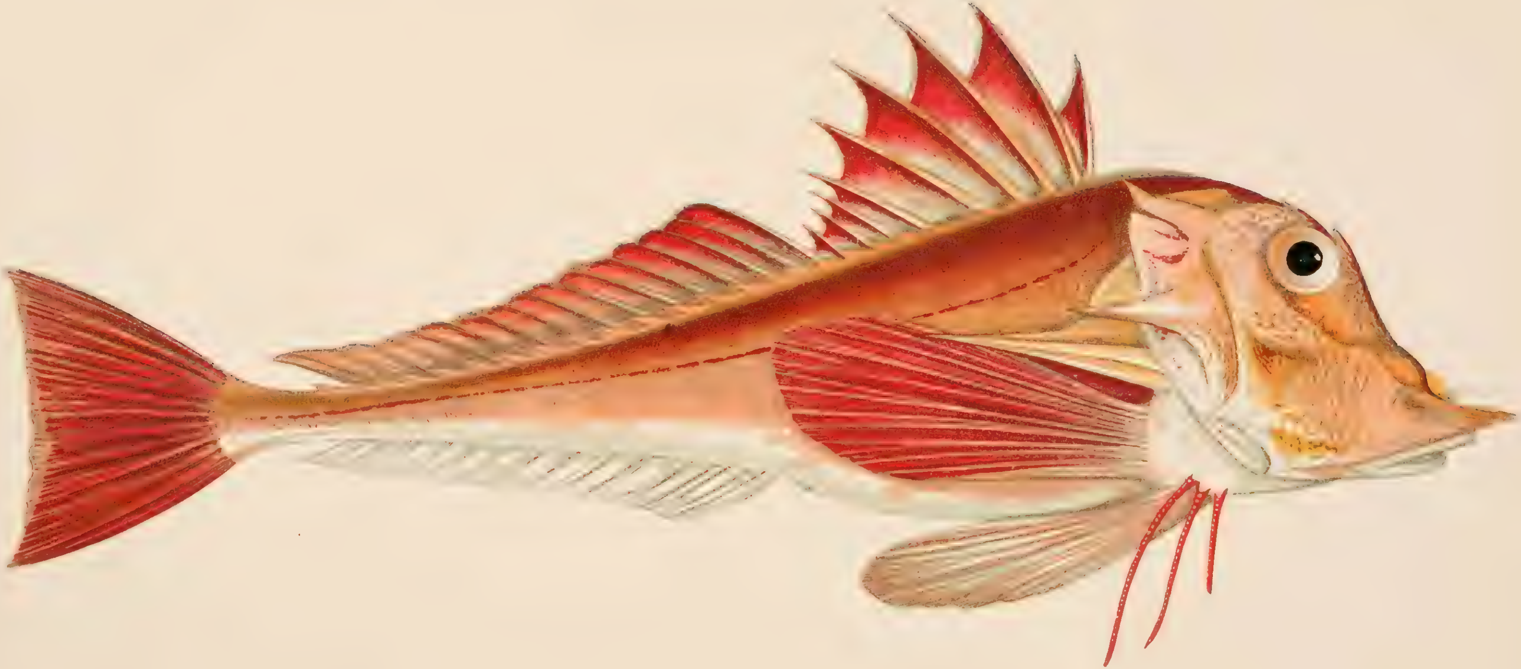
It is as common as the Elleck, with which it is sometimes confounded, and for which it is not unfrequently substituted in the market. But it is not so abundant as the last-named fish, although their habits are nearly the same; it also becomes more scarce as we proceed northward, and is omitted from the enumeration of fishes in Zetland.

The Tubfish keeps near the ground, in water of considerable depth; but it occasionally rises to the surface, as some others of kindred species are known to do. It feeds on crabs, shell-fish, and such fishes as it is able to find in its usual haunts, among stones or sand, and readily takes a bait. A pecten as large as a half-crown, a donax, and small solen or razor-shell have been obtained from its stomach. I have found it with enlarged roe at Christmas, and also in May and July.

With a general tendency to the same form as the Elleck, this fish is proportionally much stouter, and reaches a considerably larger size. I have known it to weigh almost eleven pounds. The head is short and stout, broad over the top, with a slight depression; the eyes separated more than in other British species. The sloping from the eyes to the snout steep; mouth beneath; gill-covers rough, moderately armed. Teeth fine, numerous, wanting at the symphysis. Body round, tapering towards the tail; lateral line smooth, prominent, and straight; an obscure row of spines on each side of the dorsal fins. The pectoral fins are wide, but there is some difference in their extension in different examples, sometimes reaching to two inches beyond the vent, and at other times scarcely extending so far as that organ. I have even found a difference in this respect between the two sides of the same fish.

The colour of the head, back, and sides, without the dorsal fins and tail, is red, more or less bright, but sometimes brown along the upper portion; yellower below the lateral line, and white on the belly. The pectoral fin a lively blue, especially on its upper surface and the ends of the rays; anal fin pale, tinted with red.

Fin rays—first dorsal eight, second dorsal seventeen, anal sixteen, pectoral eleven, ventral six. The two last rays of the second dorsal and anal fins rise from one root; the ventral fins large, separate, scalloped, and fastened down with a lateral border. But as regards the rays in the root of the dorsal and anal fins in the several species of the genus, there is frequent variation, and dependence must not be placed on it as a specific character.



PIPER

[illegible]

PIPER.

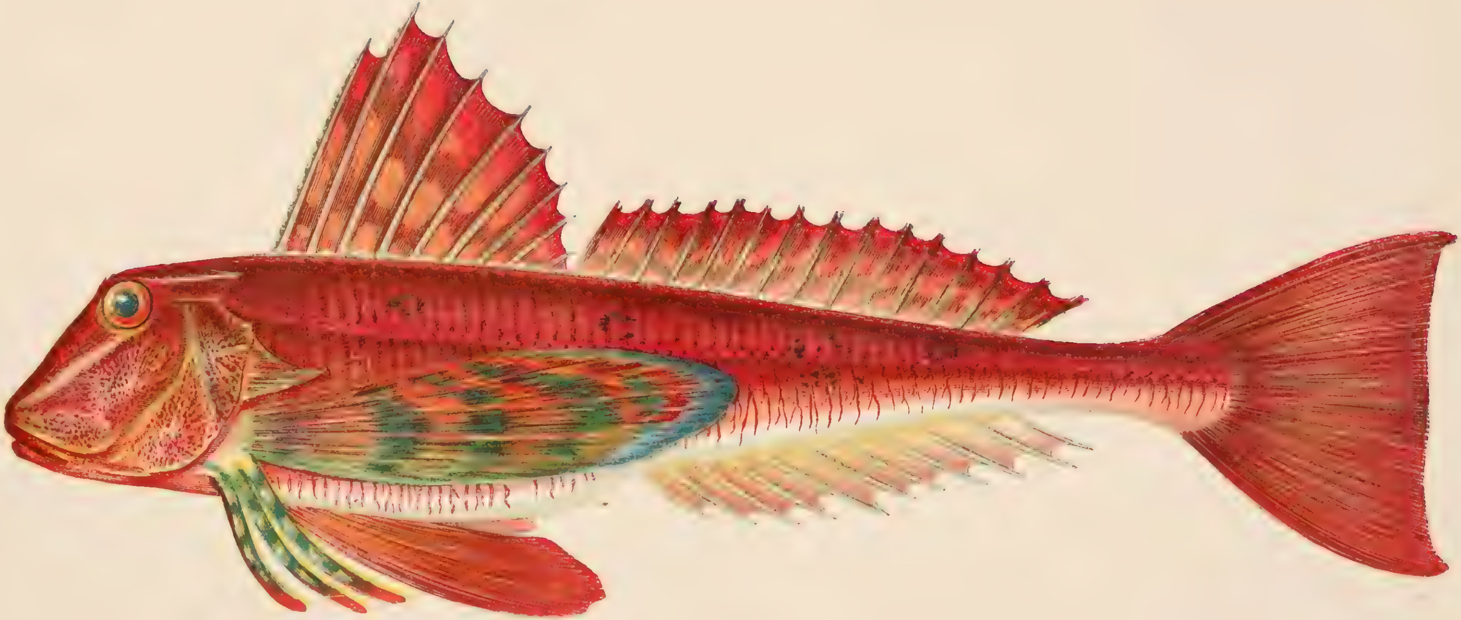
Trigla lyra,	JONSTON. WILLOUGHBY; p. 282, Tab. S. 2, f. 2.
" "	LINNÆUS. CUVIER.
" "	LACEPEDE. RISSO. DONOVAN; pl. 118.
" "	FLEMING; British Animals, p. 215.
" "	JENYNS; Manual, p. 341.
" "	YARRELL; British Fishes, vol. i, p. 51.
" "	GUNTHER; Catalogue British Museum, vol. ii, p. 208.

SEVERAL of the fishes of this genus are known to utter obscure grunting sounds when newly taken out of the water, and they continue them at intervals as long as they are alive. This circumstance has given occasion to a familiar name for most of them in some foreign languages, and is probably the origin of the common English name of this species; but it is also said to have obtained its scientific denomination of *lyra* from its shape, as if it approached more nearly than others to the ancient form of that musical instrument.

The Piper is little known in the north of England, and is not numbered among the fishes of the north of Scotland. It occurs in Ireland, but according to Mr. Thompson, of Belfast, with some uncertainty, except in the south and west parts. The Earl of Enniskillen informs me he has never seen it in the north. It is far from rare, however, on the coasts of the west counties of England, except in the winter, when it appears to seek shelter in the deeper water, or perhaps by migrating further to the south. It seems to be more abundant in the Mediterranean than in Britain. In its general habits, (the time of breeding and food,) it resembles the Tubfish, but is in rather greater estimation for the table.

The head and beginning of the back is much elevated, and the body tapers considerably towards the tail. An example twenty inches in length, measured thirteen inches in girth where thickest. Head flat on the top, slanting suddenly from before the eyes, and advancing again to form a double projection, flat and toothed, of considerable length; eyes large, high on the side of the head, a wide space between them, distinct spines immediately encircling them above; under jaw shortest; teeth numerous, small, a few in the palate. The cheeks covered with rough stellated lines; head well armed; the gill-covers with a strong spine; another, somewhat smaller, behind the head, and a very long triangular spine, the longest on the body, above the pectoral fin; the dorsal ridge, bordering the dorsal fins on each side, formed of elevated flattened spines, their points directed backward. Pectoral fin wide, reaching to the vent; tail very slightly lunated; ventral fins long and wide. Slight scales over the body. Colour of the head, back, and sides brilliant pink or scarlet, faint and nearly white on the belly. Pectoral fins, the dorsals, and tail more or less red; ventrals and anal tinged with red.

Fin rays—pectoral eleven, first dorsal eight, second dorsal thirteen, anal seventeen, ventral six. The two last rays of the anal fin are joined to one root; but examples vary in this respect, as well in this species as in the others of this genus.



STREAKED GURNARD.

LVIII.

STREAKED GURNARD.

Mullus imberbis,	Willoughby; p. 278, Tab. S. 1, f. 1.
" "	Iago; in Ray's Synopsis Piscium, p. 165.
Trigla lineata,	Turton's Linnæus. Cuvier.
" "	Donovan; pl. 4.
" "	Jenyns; Manual, p. 339.
" "	Yarrell; British Fishes, vol. i, p. 45.
" "	Gunther; Cat. Br. Museum, vol. ii, p. 200.
" *Adriatica,*	Fleming; British Animals, p. 215.

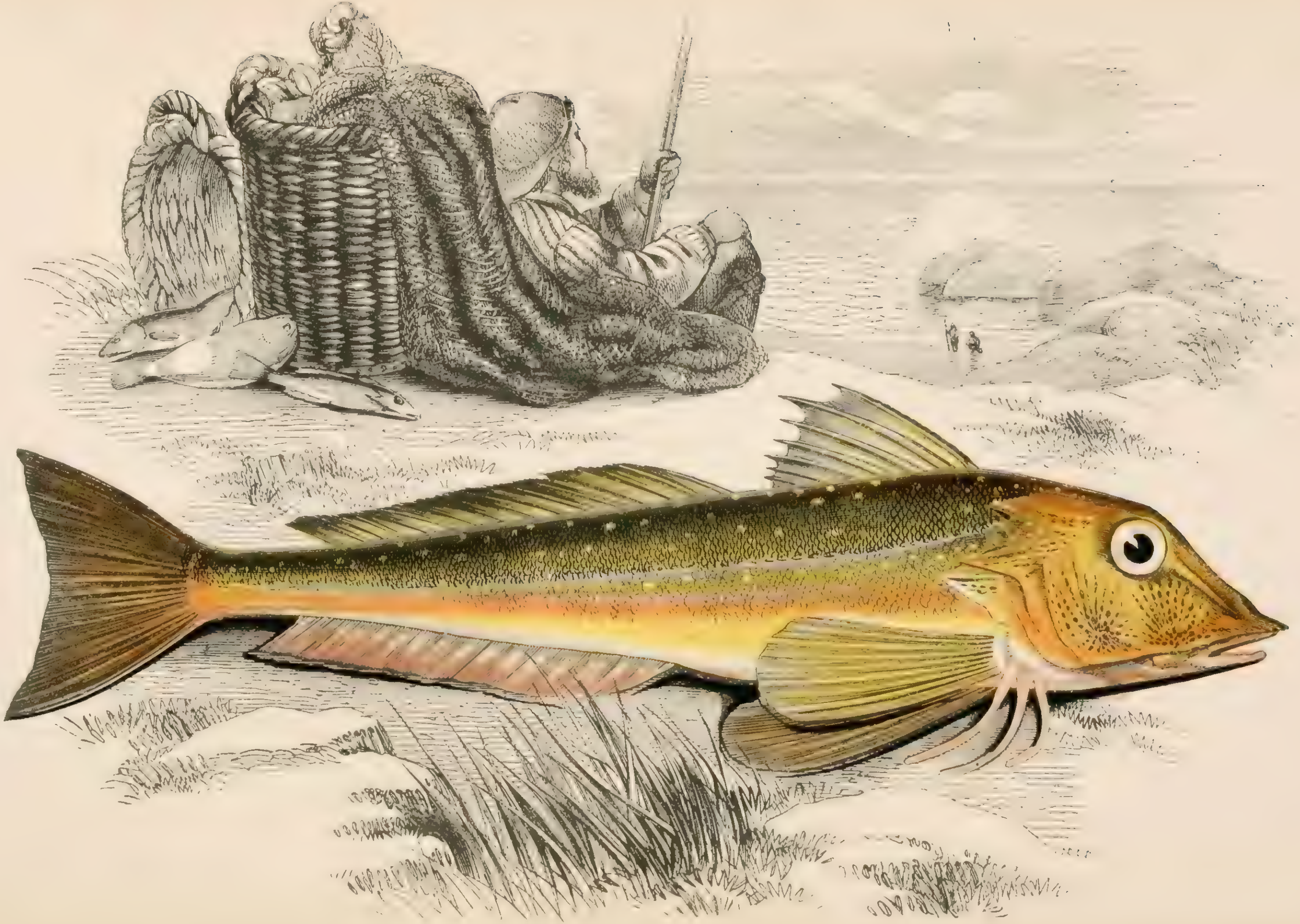
When speaking of the Surmullets we assigned a reason why the older naturalists should stand excused for classing the fish now named the Streaked Gurnard with that family, under the name of *Mullus imberbis,* the Unbearded Mullet. In its general appearance and some of its habits it greatly resembles them; and if rare (as it has been usually considered) on the western parts of the kingdom, it is only locally so, the places of resort being chosen according to its peculiar habits, and from which it does not much wander. Mr. Thompson met with it on the east coast of Ireland, and an example has been caught near Ayr, in Scotland; but this was an uncommon instance, and it is not known in the north of the latter country.

It appears to perform a partial migration, at least from its winter retreat in the deeper water to situations nearer the shore; and although it usually keeps near the ground, it appears to imitate the Surmullets in effecting its passage at a higher elevation, for I have obtained an example from a net that floated over a depth of thirty fathoms; and there is reason to believe that it even imitates one or two of the foreign species of its own genus, in springing out of the water. On one occasion, in the harbour of Polperro, (not its usual resort,) a fish was seen to do this in a way that appeared unusual, and when taken in a net it was found to be the Streaked Gurnard.

This fish does not usually take a bait, and, as its places of resort are confined to a peculiar quality of ground, it is less frequently caught than from its numbers might otherwise be supposed likely. Except in one or two rare instances, I have only obtained it from trammels set to catch Surmullets; but it is also taken with the trawl. In its stomach I have found remains of small crabs and other crustaceous animals, and small stones; but Mr. Thompson found what appeared to be vegetable matter, with a young sole and several sorts of crabs. William Thompson, Esq., of Weymouth, who obtained this fish at that place, found several dwarf swimming crabs and small stones in the stomach.

It reaches the length of from twelve to fourteen inches; the head moderate in proportion to the body, which is throughout round and plump. The eyes elevated and near together; the front sloping rather suddenly to the snout, which is not protruded, and but slightly toothed; under jaw a little the shortest; teeth just enough to give a slight roughness; cheek plates regularly and finely radiated. Front of the orbit with four short spines; a ridge behind the eye, followed by another ending in a blunt spine; a slight spine on the hindmost plate of the gill-cover—the largest above the pectoral fin. Lateral line straight, having a serrated ridge, the points directed backward. First dorsal high; the first spinous ray with rough tubercles of small size along its anterior margin, and so with the second where it rises above the first; both dorsals enclosed in a groove formed by projecting ridges of thin tubercles which have toothed edges. Pectoral fins large, reaching considerably beyond the vent. The separate fingers rather short; caudal fin straight, except the outer rays, which are slightly lengthened. Colour of the head, mouth, back, dorsal and caudal fins, vermilion, but in some examples dusky red, the dorsal fins with bars more or less strongly marked, and with some clouds of pink. The ridges which pass round the body are strongly pencilled with deeper red, and anteriorly below, sometimes with reticulations. The fingers barred with alternate rings of yellow or green and red; along the back some dark spots. Pectoral fins red, with spots and lines of green and blue, bordered with blue.

Fin rays—first dorsal ten, second dorsal seventeen, anal seventeen, pectoral ten (divided,) ventral six. The two last rays of the anal fin from one root, but subject to variation.



GURNARD

GURNARD.

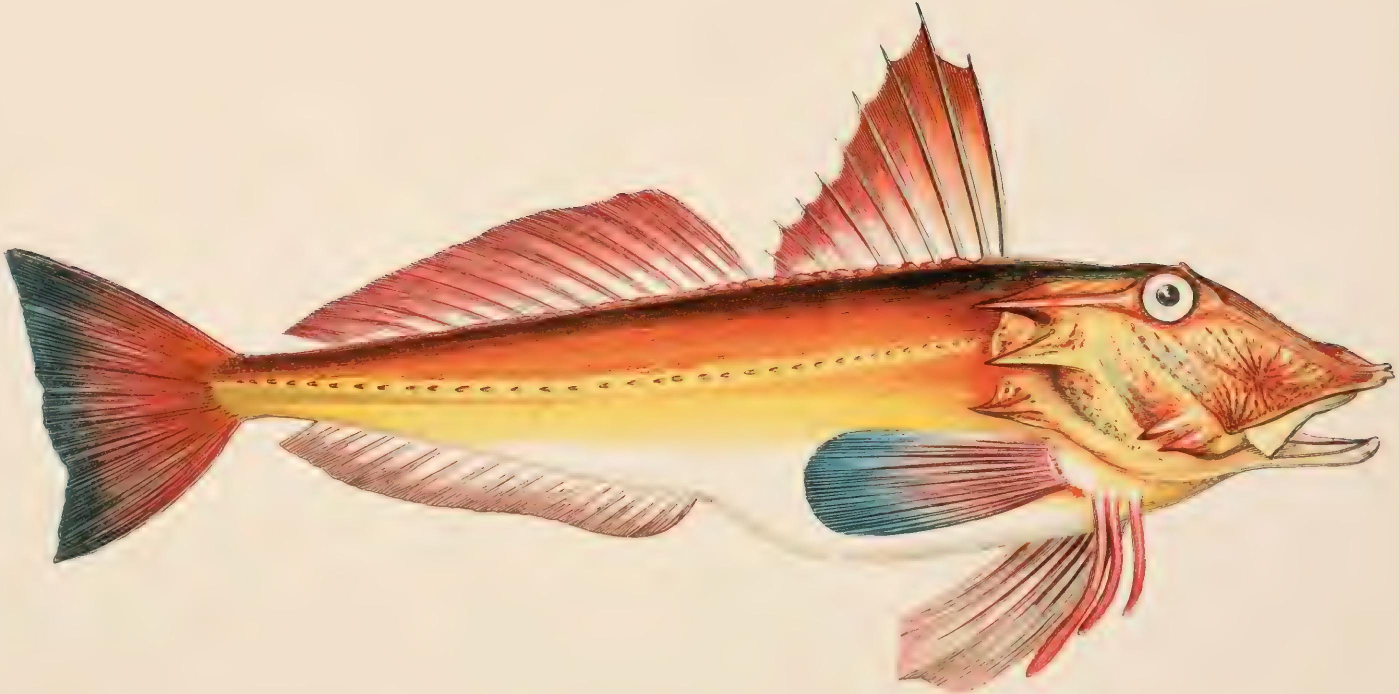
GREY GURNARD. CROONER. CROONACK.—To croon meaning in Scotland to make a dull croaking noise. GOWDIE. HARDHEAD.

Cuculus griseus,	WILLOUGHBY; p. 279, Tab. S. 2, f. 1.
Trigle gurnau,	LACEPEDE. RISSO.
Trigla gurnardus,	FLEMING; British Animals, p. 215.
" "	JENYNS; Manual, p. 342.
" "	YARRELL; British Fishes, vol. ii, p. 53.
" "	LINNÆUS. CUVIER. BLOCH; pl. 58.
" "	DONOVAN; pl. 30.

THE Gurnard is the most abundant of the British species of this genus, as it is also the most widely distributed. It is also less sensible than the others to the influence of heat and cold, and therefore it is as common on the northern coasts of Scotland and Ireland as in the south and west of England, being also reckoned among the fishes of Orkney and Shetland. From the notes I have been favoured with by the Right Honourable the Earl of Enniskillen, I learn that in or about the month of June this species appears in Donegal Bay in enormous shoals, and is then eagerly sought after by fishermen. Besides such as are used fresh, large quantities are then salted and laid up in store.

Its habits are social so far as regards its own species, for not only do they commonly keep together in companies, but sometimes in the fine weather of summer they will assemble together in large numbers, and mount to the surface over deep water, with no other apparent object than the enjoyment of the season; and when thus aloft they move along at a slow pace, and rising and sinking in the water for short distances, and uttering a short grunt, as if in self-gratification. Sometimes, indeed, they appear as if asleep, so that they do not display any sign of animation until an attempt is made to lay hold of them. But their usual place is at the bottom, where they devour shell-fish, crabs, and small fishes, like the other Gurnards, and they take a bait so freely that multitudes of them are sometimes taken together. They are perhaps as excellent for the table as the Tubfish or Piper, but their smaller size renders them less valued; and when other fish are abundant I have known them sold for two shillings and sixpence the hundredweight, and thirty for a penny. A more usual price is three or four a penny, but, as conveyance becomes more easy, a ready sale may be anticipated for what forms a wholesome and palatable article of food. The roe is deposited through the spring, at some moderate distance from land.

In its general form this species resembles the others of its genus, but more nearly the Elleck than the Tubfish or Piper, being less elevated than the latter on the head and before the dorsal fin. It does not often exceed a foot in length; the snout projecting in a slope from the eyes, bifid toothed. The mouth beneath, with a bed of teeth in the palate; teeth also in the jaws. Gill-covers with radiated lines. Three flattened triangular spines, as in the other species, but that one above the pectoral fin usually less extended than the spine of the gill-cover. A rough ridge along the back, enclosing the dorsal fins, and another (not very conspicuous) along the lateral line. In some examples the first rays of the first dorsal fin are rough also, a circumstance which appears to have been the cause of mistake, as if it were the mark of a separate species. In colour this fish varies much, but always with a tendency to grey, the ground of the back being a yellowish green, with bright yellow spots, with the sides below the lateral line pink or yellow; dorsal, pectoral, and caudal fins dusky. The pectoral fins scarcely reach to the vent. The skin is usually smeared with slime, which continues to be poured from the pores long after death.



BLOCH'S GURNARD

LXIX

BLOCH'S GURNARD.

The name of Bloch's Gurnard was given by Mr. Yarrell to a species of *Trigla*, which himself appears never to have had an opportunity of examining, but of which a figure was published by Bloch, with the name of *T. cuculus*, or the Red Gurnard; which figure Mr. Yarrell has copied in his "History of British Fishes," although with a significant difference (which we shall have to notice) between that of his first and second edition. There is now no doubt that the fish thus represented by Bloch is not the same with the *T. cuculus* of Linnæus; and if Bloch has not fallen into an important error, there can be no doubt that the species referred to is different from any one that has been recognised as inhabiting the British seas. The *Trigla cuculus* of Bloch is shewn as having the first ray of the spinous dorsal fin conspicuously higher than the second, with also a wide dark patch on the border of this fin, which Risso, in his description of what he believes the same species, makes a portion of its specific character. It is certain that in all the British species the contrary of this is the case, as regards the relative length of the fin rays; nor can we find in the figures given by Willoughby or other writers a single instance in which the first ray of the spinous dorsal fin overtops the second. After the publication of his first edition, Mr. Yarrell appears to have had his suspicions awakened on this point; and accordingly we find in the second edition of his "British Fishes," that the length of this ray is brought down to be even slightly lower than the second, although no reason is given why this correction is made, and the reference is still to Colonel Montagu's description, in the want of an example from which to obtain it anew. Montagu himself was too close an observer to have passed over without notice such a remarkable circumstance as the superior length of the first dorsal ray, if such had been the fact; and when he adds the remark that many examples are taken in summer on the coast of Devon in shore nets, we may safely venture to conclude that he neither refers to the Red Gurnard of Bloch's figure, nor to the scarce species we shall presently describe. A similar observation will apply to Mr. Jenyns, and Mr. Thompson, of Belfast. The last-named writer particularly points out the discrepancies which occur in some writers as regards this fish, and especially that one which concerns the relative height of the spinous rays; which latter particular is not referred to by Mr. Jenyns, although he mentions as an important character the presence or absence of rough granulations along the anterior border of the first two rays; a circumstance which, as I have already noticed, is exceedingly liable to vary in the species to which I suppose him to refer, that is, our common Elleck, where it is sometimes conspicuous, and at others entirely wanting.

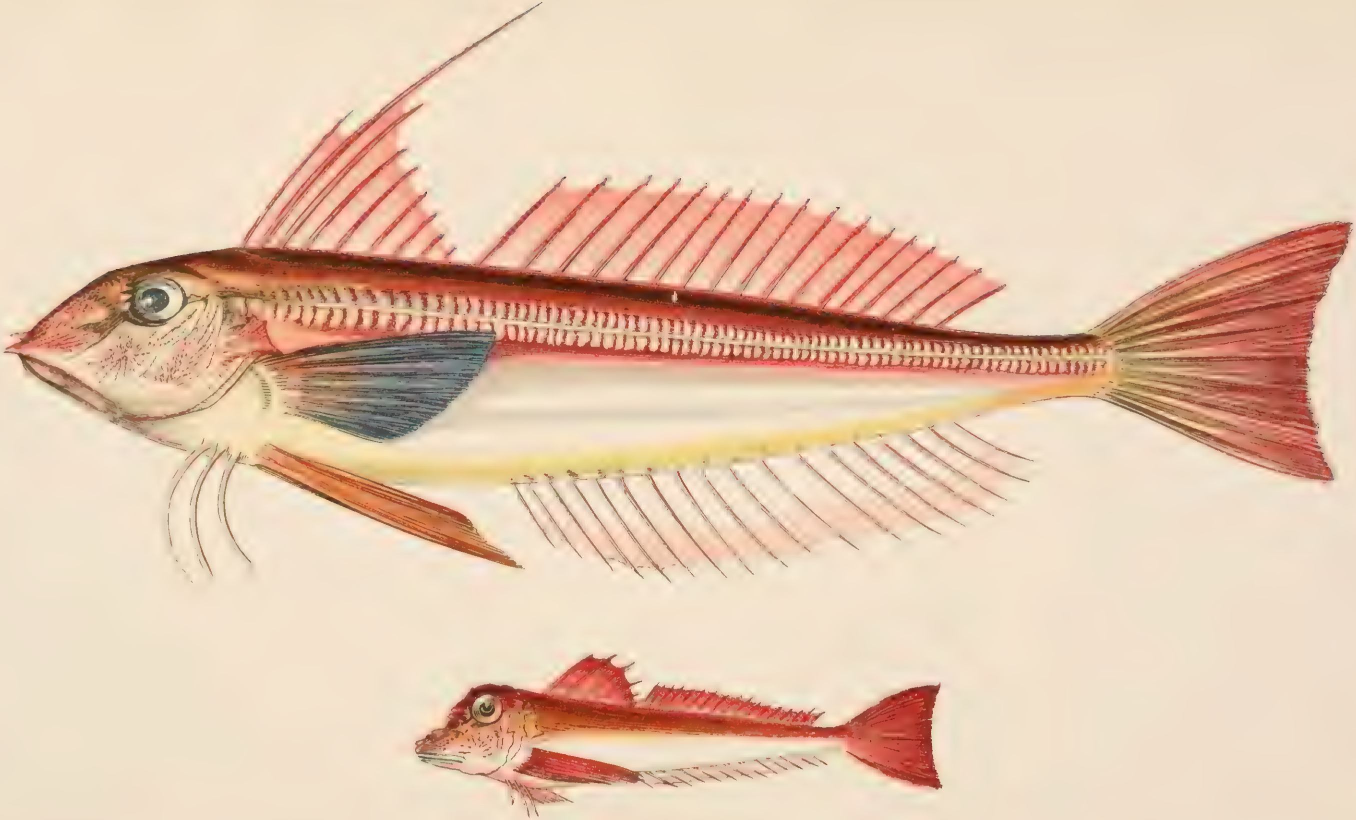
Without seeking to dispel the cloud of obscurity which thus rests upon the fish of Bloch, I will proceed to describe a species which, if not the same, is nearly allied to it, and beyond question different from all that have already passed under our notice. A particular account of it (with a figure) was first published in the "Zoologist" for the year 1846, from which again the following particulars are for the most part derived. It is to be added that I have seen two or three examples, at a considerable distance of time from each other, and that another is reported to me as having been taken in the Mount's Bay.

The length of the example described was twenty-six inches, and round the body, where thickest, the girth fifteen inches and a half; the shape much like that of the Tubfish, (*T. hirundo,*) but from the eyes to the snout more lengthened and pointed, consequently less abrupt; the head more roughly marked with similar stellated lines, and more effectually armed. The snout was deeply bifurcated, and each section was formed of three roundish distinct teeth, in this respect more closely resembling the Piper than the other British species of Gurnard. From the snout to the centre of the eye it measured four inches; summit of the head wide and flat, in which it resembles the Tubfish in a particular in which it differs from the Elleck and Grey Gurnard. Under jaw pointed, with a fleshy tubercle at the symphysis; the jaws rough, with beds of fine teeth. Cheek-plates and gill-covers very rough and striated, more so than in the Tubfish or Elleck; the usual spines being stouter, and that one on the upper portion of the hinder gill-plate much longer than in either of the two last-named fishes. The second or middle gill-plate has also two well-developed bifid spines on its lower part, the uppermost longest. The markings of the gill-plates will further distinguish this fish from our other species, the two first being striated, the hindmost punctulated, the roughness being as if dotted with a pin. The ridge bordering the roots of the dorsal fins formed of broad firm plates, which, when dried, appear marked with fine teeth. Scales on the body thin, ciliated on their posterior edge, and not arranged in regularly circular lines, as in the Streaked Gurnard. Lateral line rough, and most rough posteriorly, the roughness formed of small obtuse points; behind the fins the body is round, with a depression in a line with the margin of the tail. Pectoral fin five inches long, not reaching to the vent, and less wide than in the Tubfish. The longest finger less than four inches, the shortest two inches and a half. The first ray of the spinous dorsal fin is shorter than the three succeeding rays, the second much the longest of all. The colour of the cheeks is a mixture of silvery, yellow, and light green; iris of the eye white; the back a dusky red, but (chiefly near the head) mixed with definite curved lines of pea green; the sides yellow; belly silvery. The pectorals were pale on the outer surface, dusky within, with tints of blue on the edge. Dorsal and caudal fins pale red; the ventral and anal white; the caudal with tints of blue. This specimen weighed five pounds.

Fin rays—first dorsal nine, second dorsal nineteen, pectoral eleven, ventral fifteen, anal eighteen, caudal eighteen.

The fish above described agrees in all its essential characters with the species of *Trigla* noticed by Cuvier, (Poissons, vol. iv, p. 67,) under the name of *T. cuculus*, Bloch, from whose description it differs only in the want of a dark spot on the first dorsal fin, a circumstance which Cuvier himself allows to be liable to variation. It is remarkable, however, that in his description, which is very minute, Cuvier omits to take any notice of the supposed peculiarity already referred to, of the superior length of the first ray of the dorsal fin in Bloch's figure, an apparent proof that he did not place confidence in the truth of that remarkable particular.

The air-bladder, the shape and size of which offer satisfactory marks of distinction in the different species of Gurnards, is in this fish four inches in length and six inches in circumference, divided in front into two lobes, which are conical, but one of them larger than the other.



1 LANTHORN GURNARD. 2 LITTLE GURNARD.

LXX

LANTHORN GURNARD.

SHINING GURNARD. LONG-FINNED CAPTAIN.

Trigla lucerna,	Linnæus. Parnell; Magazine of Zoology and Botany, vol. i, p. 526.
" "	Yarrell; Br. Fishes, vol. i, p. 63.
" *obscura,*	Cuvier. Gunther; Catalogue of British Museum, vol. ii, p. 210.
" *milan,*	Lacepede. Risso.

It appears that Linnæus at first called this fish *Trigla obscura*, but perhaps becoming aware of the impropriety of a name which seemed to contradict one of the supposed characteristics of the species, he changed it for another which especially refers to its supposed property of affording light, and which is more particularly the parent of one at least of its English denominations.

The Lanthorn Gurnard was first made known as inhabiting the British seas by Dr. Parnell, who was at that time engaged in studying the fishes of our country. He obtained several examples from the trawls at Brixham, where it was well known to fishermen under the name of the Long-finned Captain, from the great elevation of the primary rays of the first dorsal fin; but it had remained generally unknown from the little value set on it on account of its small size and consequent unfitness for the table. I have obtained it from Plymouth, but it does not appear to be caught in any abundance, and its habits prevent it from being taken by other means than by the dredging operation of a trawl. I know no instance of it having taken the hook.

This fish appears to be well known in the Mediterranean, where, according to Lacepede and Risso, its manners are highly interesting. By both these writers it is believed to possess the property of displaying a conspicuous light by night—an opinion as old at least as the days of Pliny, (B. ix, C. 43;) and Risso supposes that this faculty is common to all the species of this genus. The shining parts of this fish are supposed to be the head and mouth; and so brilliant are they said to be, that, according to Lacepede, when the fish darts through the water, the appearance is like that of a shooting star. But until this phenomenon has been subjected to further inquiry, we cannot accept it as unquestionable, for appearances not unlike it have been noticed in other fishes, that are capable of receiving a different explanation, and Cuvier positively denies the existence of this property in any species of this genus. It is a well-known fact that there exist minute inhabitants of the ocean, of a pulpy nature, which are almost invisible to the naked eye, but which, when excited, are capable of giving out a brilliant light, that, when widely spread, is known to fishermen and sailors by the name of briming. It occurs in almost every region of the globe, except the very cold, and with us is most abundantly noticed in the summer and autumn. These little animals, which are transparent in their own substance, are in the habit of attaching themselves to any body with which they come in contact, and when thus situated they display their brilliant light so much the more freely from the activity put forth by the substance or animal on which they are fixed. There are instances known, in which animals of the ocean, of several sorts, have been supposed to afford a conspicuous light, when the real cause has been no other than an excited molluscous creature attached to its surface, and such is probably the case as regards the Lanthorn Gurnard. We learn also from Lacepede that these fishes swim in companies, and when pursued by an enemy, that they spring into the air for escape. It is probably for this reason, that, among its other names, this fish was called the Milan and Milvus, or the Kite.

The Lanthorn Gurnard scarcely reaches a foot in length, and is more slender than several others of this genus, in this respect approaching more nearly to the form of the Grey or Common Gurnard, but with still less elevation of the head. The eye is moderately large, and from it the head slopes gradually to the snout, which is armed with two protruded spines. The usual spines on the gill-covers are but little developed. The line of spines along each side of the roots of the dorsal fins is not well marked; but on each side of the body from the upper part of the gill-covers to the tail runs a broad line, formed of plates, the longest diameter of which is perpendicular to the length of the fish. Authors have described the lateral line as doubled, and Linnæus notices this circumstance in the specific character of this fish; but nothing like this appears on examination, and Dr. Parnell, who describes the fish minutely, says nothing of it. In my specimen the ventral fins are a little longer than the pectoral; but a remarkable character is the great extension of the second ray of the first dorsal fin, which is nearly twice as long as the first ray. The colour of this fish is red, paler below, but in our example the colour has faded.

We copy Dr. Parnell's enumeration of the fin rays:—First dorsal nine, second dorsal seventeen, pectoral twelve, anal eighteen, ventral six, caudal nine.

LITTLE GURNARD.

Trigla pæciloptera,		YARRELL; Br. Fishes, vol. i, p. 49.
"	"	THOMPSON; Nat. Hist. of Ireland, vol. iv, p. 79.
"	"	GUNTHER; Cat. Br. Museum, vol. ii, p. 203.

THIS, the smallest species of all the British Gurnards, appears to have been generally overlooked, from the supposition that it was no other than an early stage of the growth of the Common Grey Gurnard. It was first made known as an inhabitant of the British Islands by Mr. William Thompson, of Belfast, whose account of it we extract, as comprising almost the whole of what is known concerning it.

"In the Zoological Proceedings for 1837, I published the following notice of an Irish specimen of this fish, the first procured in the British Islands.

Trigla pæciloptera, Cuvier and Valenciennes. Little Gurnard. —Amongst the number of fishes submitted to my examination by Mr. Bell, is a Gurnard, apparently of this species, which was taken at Youghal, I believe along with sprats, early in the summer of 1835. In form it agrees in every character by which the *T. pæciloptera* is said to be distinguished. Judging from its present appearance, I have little doubt that when recent it would in colour also have corresponded. Its length is two inches. Fin rays—dorsal ten, (last extremely short,) fifteen; pectoral ten, (three free;) ventral five; anal fifteen; caudal fifteen. Second dorsal ray longest; twenty-five dorsal spines; caudal fin a little forked; lateral line spinous. Thence to the dorsal fin, and to an equal distance below the line, rough with spinous scales, (this is not mentioned by Cuvier and Valenciennes;) lower portion of the sides smooth. With the *T. aspera,* Viviana, as described in the last-quoted work, and which in length is stated, like the *T. pæciloptera,* to be about four inches, the present specimen agrees in many respects, but chiefly differs in the profile being less vertical, in the anterior lobes of the snout, and in the negative character of wanting a deep transverse hollow behind the posterior orbital spine; nor with the highest power of a lens can any of the anterior dorsal spines be distinguished as toothed, nor the first and second rays of the dorsal fin as serrated, both of which characters are attributed to *T. aspera.*

Since the above was written I have had an opportunity of comparing the *Trigla* here treated of with two specimens of *T. aspera*, one three inches and a half, the other four and a half long, which are part of a collection of fishes sent from Corfu by Robert Templeton, Esq. This comparison served strongly to confirm everything above stated. The *T. pœciloptera* had previously been obtained only at Dieppe, where it was discovered by M. Valenciennes." William Thompson, Esq., of Weymouth, informs me that this fish is also taken in the trawls at that town, and sometimes in considerable numbers.

Examples nearly answering to the foregoing account have also come under my notice at Falmouth and from the Bristol Channel, from the latter of which the following description is derived:—The example scarcely exceeded an inch in length; the head large; eyes elevated; top of the head rather flattened; in the middle of the ascent from the snout to the eye are spines bent upward; separate tubercles near the snout; short spines in front of and above the eye. Towards the neck at the middle a pair, not close together; another pair behind them, even with the first ray of the first dorsal; and again on a line with the eye, just above the pectorals, a sharp spine: another on the posterior gill-cover. A blunter pair on the angle of the jaw, a little before the ventral fins. A long prominent line of sharp points borders the dorsal fins. First dorsal high, close behind the head; second dorsal but little separate from the first. The colour of this example, preserved in spirits, was a dull green.

PERISTIDION.

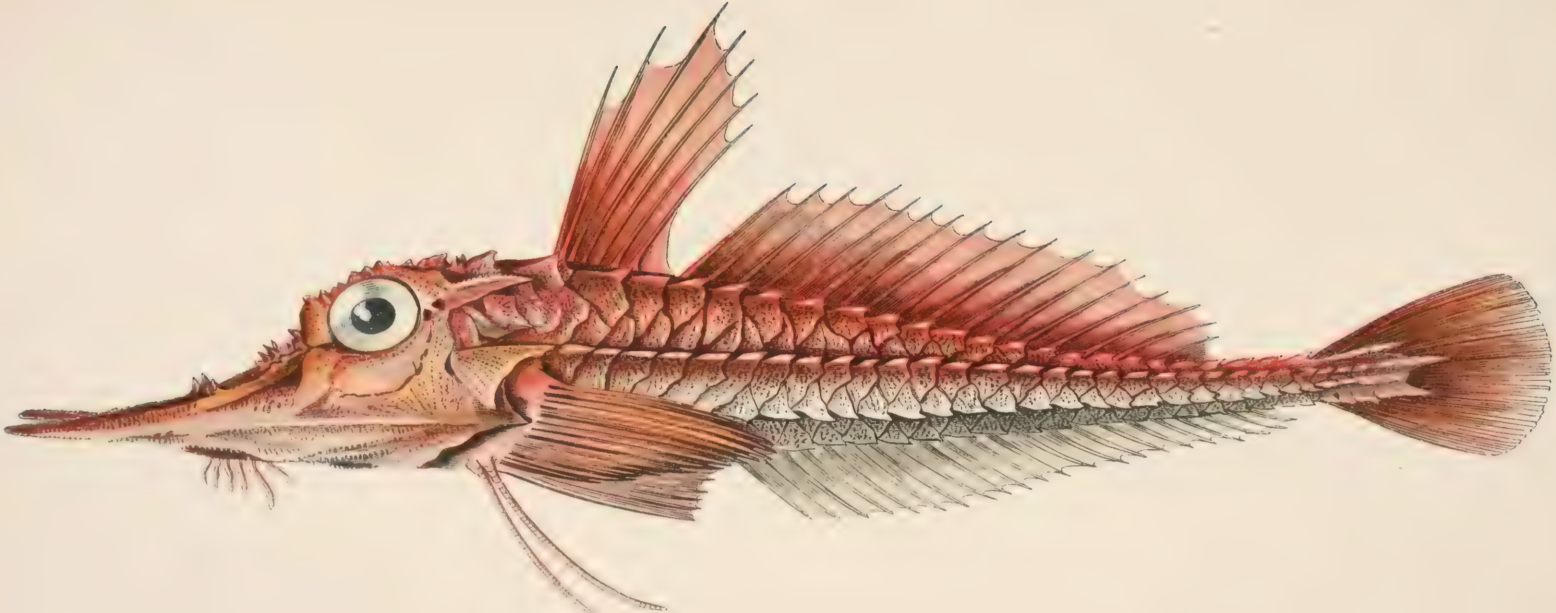
With the general form of the Gurnards the snout is much more lengthened; the body completely covered with plates, which are arranged in ridges lengthwise. The separate processes are only two, one on each side.

ARMED GURNARD.

MAILED GURNARD. MALARMAT.

Lyra altera Rondeletii,	Willoughby; p. 283, Tab. S. 3.
Trigla cataphracta,	Linnæus.
Peristedion malarmat,	Lacepede. Risso. Cuvier.
" "	Loudon's Magazine of Natural History, New Series, vol. i, p. 17.
" "	Yarrell; British Fishes, vol. i, p. 67.
Peristellus cataphractum,	Gunther; Cat. Br. Museum, vol. ii, p. 217.

It appears that the Armed Gurnard is not rare in the Mediterranean, where, as we are informed by Risso, its haunts are chiefly in deep water, but that it comes within reach to be caught at the equinoxes. It seems, however, to be a local species, for Willoughby did not find it at Venice during a residence of four months, nor at Genoa beyond a single example; but in the markets of Rome it was of frequent occurrence. It is a rare visitant to Britain, and hitherto has been taken only on the coast of Cornwall. It was first announced as British by Dr. Edward Moore, of Plymouth, from an example taken with a trawl in the neighbourhood of the Eddystone; and since then I have been informed by Mr. Peach of two that were caught by a boat off Gorran, where that gentleman at that time resided. A fourth has come to my hands from



ARMED GURNARD

LXVI

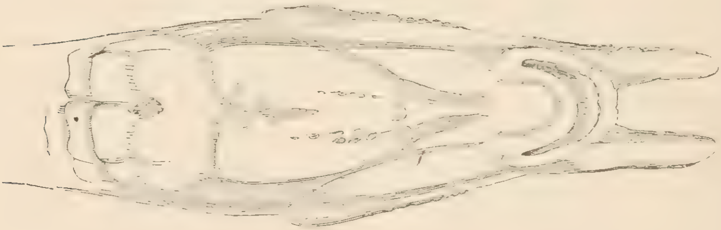
Mr. Richard Quiller Couch, of Penzance, from which our figure has been taken.

It is described by Risso as a solitary species, that is very active in its movements, and often rises high in the water, which it is able to accomplish the better through the help of an air-bladder of more than ordinary size. But when at the bottom, its restless motion, by driving it against rocks and stones, causes the breaking off of one or both of the projecting processes of the snout. Its food is molluscous animals, worms, and sea-weeds.

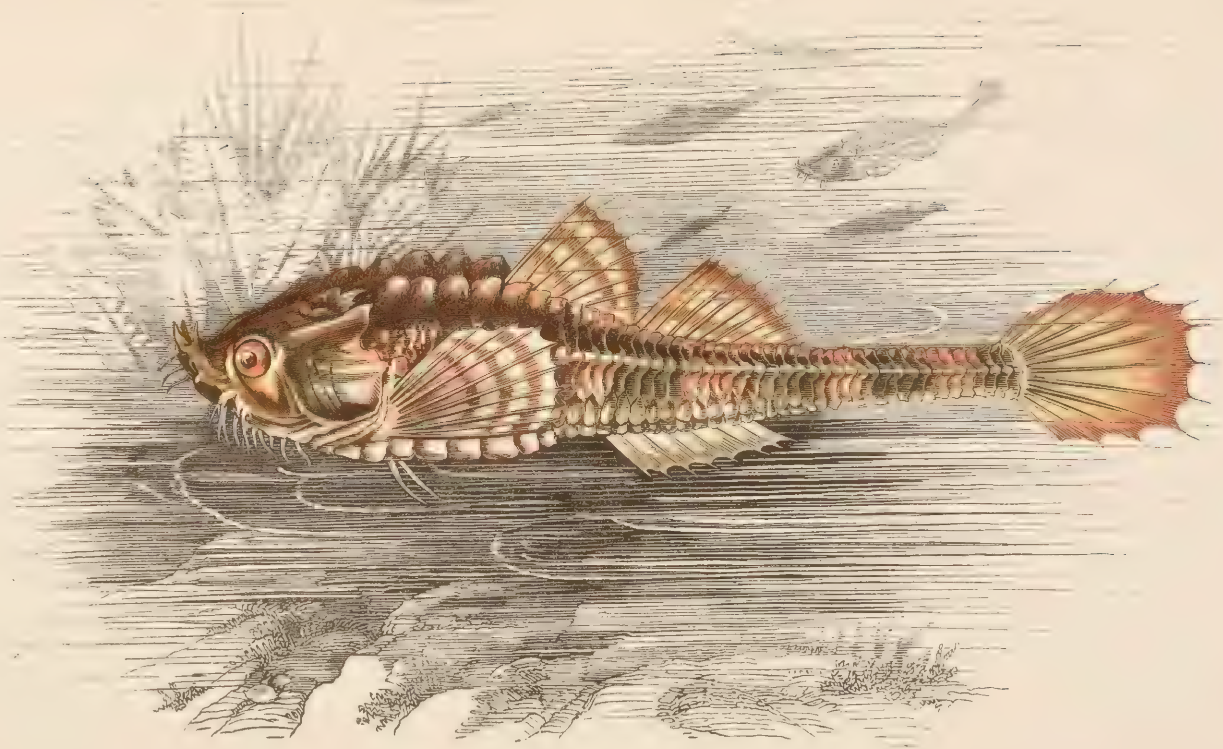
The length of this fish is about a foot, but in the Mediterranean it is said to grow to double that size. Dr. Moore's example measured eleven inches, of which the bifid snout projected to the extent of an inch, but in my own specimen the length of the snout was greater than this. The eye is oval, high on the side of the head, with the slope thence to the root of the bifurcation of the snout gradual, and made rough by several pointed tubercles. The eyes stand apart, with a formidable border of spines above them; a serrated spine behind each eye, and a broader one, irregularly triangular, on the gill-covers; a third below, with a ridge, which appears like a lateral continuance of each branch of the snout. These spines and the cheek-plates rough with granular elevations. The line of the mouth circular; jaws without teeth; several filaments hang from the chin. The body is shaped into an octangular form by a series of plates having a sharply-raised edge in the middle, by which means the octangular lines become toothed like a saw. The uppermost row of these lines forms on each side a border to the roots of the dorsal fins, and begins close to the head; and three of these ridges throw out a slender bony process as a guard to the root of the tail. In Dr. Moore's figure the dorsal fins are united, and the first ray is the longest; the fin gradually sloping backward to near the tail, which latter organ is concave, as in that of Mr. Yarrell, with (in Dr. Moore's fish) the rays projecting beyond the membrane.

The last-named circumstance, however, is to be ascribed to the rough usage sustained by all fishes caught in a trawl, as was probably the case also with Mr. Yarrell's example, in which the first dorsal fin is represented low, with the rays projecting far beyond the membrane. In the specimen from which our figure was taken the tail was round, with the rays contained within the border of the membrane. The first dorsal also was distinct from the second, with the third rays longer than the second, and much longer than the first, the membrane extending from close to the top of each to the next succeeding. The second dorsal rises close to the first, and ends at some distance from the tail; the rays moderately high. The anal fin ends nearer the tail than does the second dorsal. The pectorals reach a little beyond the vent. The two separate fingers are placed as in the true Gurnards.

The colour of this fish is red, (that described by Dr. Moore was scarlet,) softening into pale flesh-colour below; the anal and dorsal fins crimson; other fins pale and inclined to grey.



Head of Armed Gurnard.



POGGE

LXXII

ASPIDOPHORUS.

The body covered with angular plates; the pectoral fins simple, (without separate fingers.) Two dorsal fins, distant from the tail; ventrals small.

POGGE.

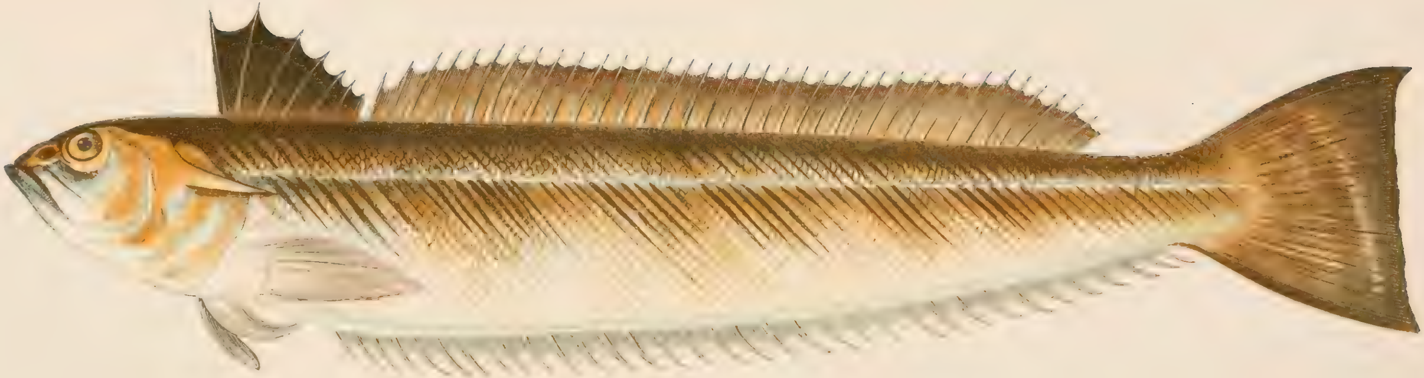
ARMED BULLHEAD. LYRIE. SEA POACHER. NOBLE.

Cataphractus,	Jonston; quoting Schoneveld, who was the first to describe it.
"	Willoughby; p. 211, Tab. N. 6.
Cottus Cataphractus,	Linnæus. Bloch; pl. 39.
" "	Donovan; pl. 16.
Aspidophore armé,	Lacepede.
Cottus Schoneveldii,	Fleming; Br. Animals, p. 216.
Aspidophorus Europœus,	Cuvier.
" *Cataphractus,*	Jenyns; Manual, p. 346.
" "	Yarrell; Br. Fishes, vol. i, p. 85.
Agonus Cataphractus,	Gunther; Catalogue Br. Museum, vol. ii, p. 211.

This fish is found to abound most in the German Ocean; but it is not uncommon along the shores of the British Islands; where it is sometimes taken in harbours or near the mouths of rivers, but occasionally at several miles from land, and at a depth of several fathoms; where it keeps near the bottom, and feeds on worms and the smaller crustaceous animals. I have not heard of its taking a bait; one reason of which may be the small size of its mouth, that will not admit of a hook of the size commonly used in the places it frequents, which are stony or rough ground that is free from rocks. It is therefore for the most part obtained only by nets, the dredge, or trawl. The Rev. Walter Gregor, of Macduff, informs me that he has found it in the tide pools near that place, and also that he has taken it from the stomach of a haddock caught at five miles from land. The time of spawning is said to be in spring.

They are reported to form an estimable dish; but the Poggè is of two small a size, and perhaps too scarce, to be entitled to much regard as food with us.

It grows to the length of from four to six inches; the general form angular, from the rows of tubercles produced by the plates with which the body is covered. The head is wide, flattened, spreading towards the cheek, and becoming narrower towards the snout, which ends in two upright forked spines. The eyes moderately large, separate; mouth under the snout, narrow; teeth small, numerous; tongue large. The whole head well defended, covered with a crust; a strong, blunt spine runs backward from behind each eye; two others on the gill-covers; obscure twisted spines above, near the angle of the mouth. Under the throat numerous slender filaments, and a few also under the snout. Behind the head the back rises high and wide, and from the first rays of the dorsal fins it slopes to the end of the second dorsal; from whence it proceeds more slender and even to the origin of the tail. From the top of the head run two prominent ridges, which join behind the second dorsal fin, and from thence pass less prominently to the tail. On the side, opposite the middle of the first dorsal, another ridge begins; and below this two stronger ones, close to the pectoral fin. The first of these runs to the tail, and the lowermost encompasses its side of the belly, to join the corresponding ridge of the other side behind the anal fin; from whence it runs to the tail. Lateral line bent, the whole formed of strong closely united plates, of which there are twenty-nine in the most prominent ridge. Dorsal fins two, near each other, and about the middle of the body; standing in a depression between the two uppermost ridges; the first rays of the first dorsal longest. The anal fin ends at about the termination of the second dorsal. Pectorals large; ventral fins small and slender; tail round; all the rays of fins extending beyond the membrane. The vent far forward from the anal fin. The colour varies much—sometimes dusky; at others with a ground of pale pink or red, and separate bands of brown or dark; with bands also on the pectoral and dorsals; the tail bordered with red; filaments under the throat white.



GREATER WEEVER.

[illegible]

TRACHINUS.

The head compressed; eyes high, and close together; angle of the mouth depressed, the lower jaw closing a little over; a long sharp spine on the hinder part of the gill-cover. Two dorsal fins: the first short, with firm sharp rays; second dorsal and anal long. Ventral fins close to the throat, and thus arranged as jugular fishes by Linnæus.

GREATER WEEVER.

STING-GULL. CATFISH.

Draco minor araneus,	Jonston; Tab. 21, f. 3.
“ *sive araneus,* (*Weever,*)	Willoughby; p. 288, Tab. S. 10.
Trachinus, draco,	Linnæus. Cuvier.
“ “	Jenyns; Manual, p. 335.
“ “	Yarrell; Br. Fishes, vol. i, p. 24.
“ *vive,*	Lacepede. Risso; p. 108.
“ “	Donovan; pl. 107.
“ *major,*	Fleming; British Animals, p. 214.
“ “	Gunther; Cat. Br. M., vol. ii, p. 233.

The several genera of fishes which are distinguished by having their cheeks armed and defended with a crusty covering, or their heads with strong projecting spines—to which our attention has been directed hitherto—appear to be more formidable in appearance than in reality, the bristling arrangement of their weapons being only adapted to defence against attack, without the power of inflicting injury on such of their fellow inhabitants of the deep as do not molest them. Very different is the case with the fishes of the genus *Trachinus*, which, without the same means of defence as the Gurnards, by being furnished with a pair of piercing spines, and the skill to use them as instruments of attack, have from an early date obtained for themselves a formidable reputation under the names of Spiders and Sea Dragons.

Pliny uses both these names, but, as it appears, with the understanding that they belonged to two separate, although kindred species; both of which are now recognised as being found in the Mediterranean, although, until of late, they had since his time been coufounded together. Conscious of the presence of the long and piercing spines with which the superior portion of their gill-covers are armed, they scarcely wait to see the near approach of danger. The apprehension of it is enough to call them into action; and with a dread of what may follow, if we may credit the poet Oppian, the fishes which happen to be near give way, and suffer them to march along without attempting to obtrude upon their course:

> "Weevers, whose march the timorous shoals obey,
> Divide their ranks, and humbly give the way."
> B. 2.

Their usual haunts are near the bottom on sandy ground, commonly at no great distance from the land; but I have known this fish taken in a floating net over thirty-five fathoms of water, and when several have been thus caught, it has always been in the early morning cast of the nets, as if they thus mounted aloft only in the darkness of the night. A fisherman expressed to me his belief that he had even seen this fish spring above the surface. Its more familiar habit, however, appears to be to conceal itself in the sand, where its variegated colour on all the parts exposed must prevent it from being readily discovered. A particular organization of the blood-vessels of the tail appears to provide for the development of organic sensibility in that organ, for the purpose of enabling the fish to excavate a place and cover itself over; as I have noticed also in some other fishes that are possessed of a similar faculty of hiding themselves, of which the Launce and generally the flat-fishes *(Pleuronectidæ)* are instances. In this position, the head only of the Weever appears above the sand, but the fish is ready to spring up on the slightest notice, and to move away with great celerity. In this situation of concealment it may chance to be left uncovered by the ebbing tide; but it is highly retentive of life, even when caught with a net or line, and therefore it suffers nothing by being left thus exposed; and I have been informed of an instance where a dog, by its pawing in the sand, shewed its sense of some unwonted object that was concealed below, which, when discovered by digging, inflicted a blow on two persons who endeavoured to grasp it, to their no small surprise and pain.

The precision and skill with which the formidable spine of the neck is thus directed to an object of fear that shall touch it or approach too closely are indeed surprising, so that by a sudden and rapid impulse it will inflict a wound if even the touch is confined to the tail, and that too without any injury to itself; and formidable indeed is the effect produced by the puncture. It is certain that no exudation or discharge of a poisonous fluid proceeds from this projecting spine; but it is equally certain that the pain which instantly follows the puncture is severe, and there are instances where within a few minutes this pain has extended from the hand as high as the shoulder. On one occasion, when a fisherman had laid hold of a Weever which he had taken on a line, the sudden plunge of the piercing instrument instantly compelled him to drop his prize; and when, ignorant of the danger, it was grasped successively by two other persons, so great was the agony felt by all of them, that they were compelled to leave their fishing, and proceed to land in order to procure relief; which, however, was readily obtained by means of smart friction with the sand of the shore. Nor has the frequency of instances of this accident been lost upon fishermen, who, in consequence, are usually careful to avoid the risk to which the incautious meddlings with this fish would expose them. And the danger is not wholly removed after the Weever is dead; and we are told that on this account, in some places it is provided by law that this formidable dart shall be removed before its bearer is offered for sale in the market. The spines of the dorsal fin have also been an object of dread, and there is no doubt that a puncture from them might be followed by unpleasant consequences, such as are known sometimes to be produced by those of other fishes that are similarly furnished; but in these cases the wound is only accidental, and the fish does not employ them for any purpose of injury or defence.

Various were the remedies employed in ancient times to remove the pain, and cure the supposed ill consequences that might arise from a puncture by the spine of this fish; and several of them were not a little absurd, although prescribed by eminent physicians. Paulus Ægineta gives an enumeration of these remedies; but Pliny and Dioscorides are content with the body of the fish itself, to be cut open and applied to the wound. If conveniently to be obtained, it is probable that friction with olive oil, in which a litttle camphor and tincture of opium are diffused, would be effectual; but if left to itself it is said that the pain will subside spontaneously in twelve hours, which space of time was supposed to be connected with the duration of the ebb and flow of the tide.

This species has a wide range of distribution, and is found, not only in the Mediterranean, but on the coast of Africa, as far as the Cape of Good Hope. In our own islands it is most abundant in the West of England and Ireland, and is caught most frequently in summer and autumn; but it has been found also in the German Ocean, and the farthest north of Scotland, but has not been recognised on the north coast of Ireland. As food it is not thought of with us, but it is described by French writers as of superior delicacy. It seems probable that the spawn is shed at the beginning of summer. A young example, measuring only three fourths of an inch in length, taken in a drift-net in the month of August, was of interest as displaying the order and degree of development of its parts at that early stage of its existence. The long and sharp spine on the hindward part of the neck had not come through the skin, but as the skin became dry the ridge formed by it could be seen. The bony structure before the eye was visible, but not prominent. The colour had begun on the anterior portion of the body only, and a large part of the sides, belly, and tail remained transparent. The top of the head and neck possessed colour, with dots of fine star-like spots; more slightly coloured along the back with some transverse bands, which are more faint backward, and none appear near the tail. The lower half of the pectoral fins have colour, but the upper portion are without it. Two or three rays on the inner portion of the ventral fins are black. It takes a bait, and I have found shrimps and small fishes in its stomach. From one example I took two Gobies and a Launce: from another a Squid, *(Loligo media,)* five inches in length.

The general form is long, narrow, and compressed, the example described measuring ten inches and three fourths in length, with a breadth (where widest) of one inch and five eighths. The head short, compressed, flat between the eyes, and rough on the summit; eyes on the fore part, high, with some short spines above them; nostrils single, near the eye, with a firm margin, terminated above and below by a small spine, the uppermost directed upward, the lower near the mouth, and inclining downward. Angle of the mouth depressed, under jaw projecting, numerous teeth in both jaws; tongue large. The hindmost gill-cover lengthened posteriorly, and furnished with a long and sharp spine, which is directed backward. The lateral line rises a little at first, passes along nearer the back, and sinks suddenly near the tail: two plates with rough edges at its origin. The belly short, the vent being less than five inches from the front. Scales on the gill-covers and body. Dorsal fins seated in a furrow; first dorsal short, beginning rather before the root of the pectoral, the second beginning close to the first, and reaching within a short distance of the tail. Pectorals low, wide, near the ventrals; the last-named fins close together, under the throat; tail a little incurved. Colour yellowish brown on the back, light purple below the eye; on the gill-covers yellow, with sometimes light blue stripes. The body covered with narrow, regular, intermingled brown and yellow lines, which run obliquely from the back below, and become lighter before they disappear. The fin rays generally extend beyond the membrane; the first dorsal black or deep brown, the second and the tail sometimes striped or mottled with yellow and brown.

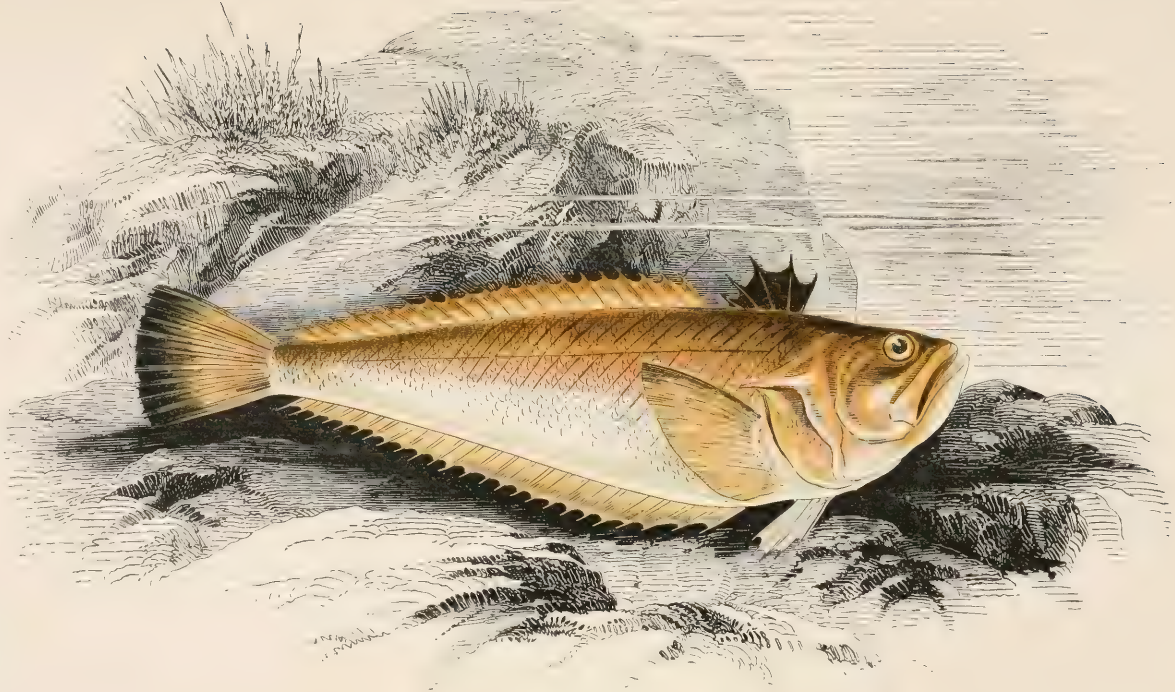
Fin rays—first dorsal six, second dorsal thirty-one, pectoral sixteen, ventral five, and caudal thirty-one. A Weever was obtained from a trawl, with a remarkable deficiency in the second dorsal fin, which failed at about the third posterior portion of its length for the space of an inch and a half. There was no mark of a fin or its rays at that part, and the intermediate bones, which stand between the fin rays and the spinous processes of the vertebræ, were wanting; so that the fish in fact possessed three dorsal fins.

VIPER WEEVER.

Little Weever, Otterpike,	Ray; Synopsis Piscium, p. 92.
" " "	Donovan; pl. 23.
Trachinus vipera,	Cuvier. Jenyns; Manual, p. 336.
" "	Yarrell; Br. Fishes, vol. i, p. 29.
" "	Gunther; Cat. Br. M., vol. ii, p. 236.

The reference we make to Ray's "Synopsis," which might be associated with another to Willoughby's "History of Fishes," affords no exception to the remark that this species was not known to naturalists until the early part of the present century; for before that time it was generally confounded with the Greater Weever, already described, both as regards its form and habits. The Viper Weever, however, is common on most of the shores of Britain and Ireland, and in some parts is more common than the larger species. This is particularly the case in Scotland and the northern portions of the United Kingdom, which perhaps may be ascribed to the nature of the ground, as fitted to its habits, as much as to the cooler condition of the water. It is even more accustomed to hide its body in the sand than the former, and is quick to inflict its sting on the feet of such as may tread on it when thus concealed. It is also ready to give battle to those who may entangle it in a net or take it on a line, which Mr. Thompson reports as not uncommon at Youghal by boys fishing at the quays. I have known it taken in a harbour where salt and fresh water met together, with a preponderancy of the former.

This fish rarely exceeds the length of four or five inches, and is proportionally deeper in the body than the Greater Weever, the greatest depth being immediately below the first dorsal fin. The front of the head appears less visibly armed than in the kindred species, but the principal spine on the



VIPER WEEVER.

gill-cover is not less formidable, when an allowance is made for the smaller size of the fish. The lines exist which correspond with those which adorn the body of the Greater Weever, but they are more faintly marked, and not so numerous. The fins are much alike, except that the first dorsal seems shorter, and the tail is not concave, but a little rounded. The colour is mottled, on a ground of yellowish brown, with some cross bars on the head and beginning of the back.

UMBRINA.

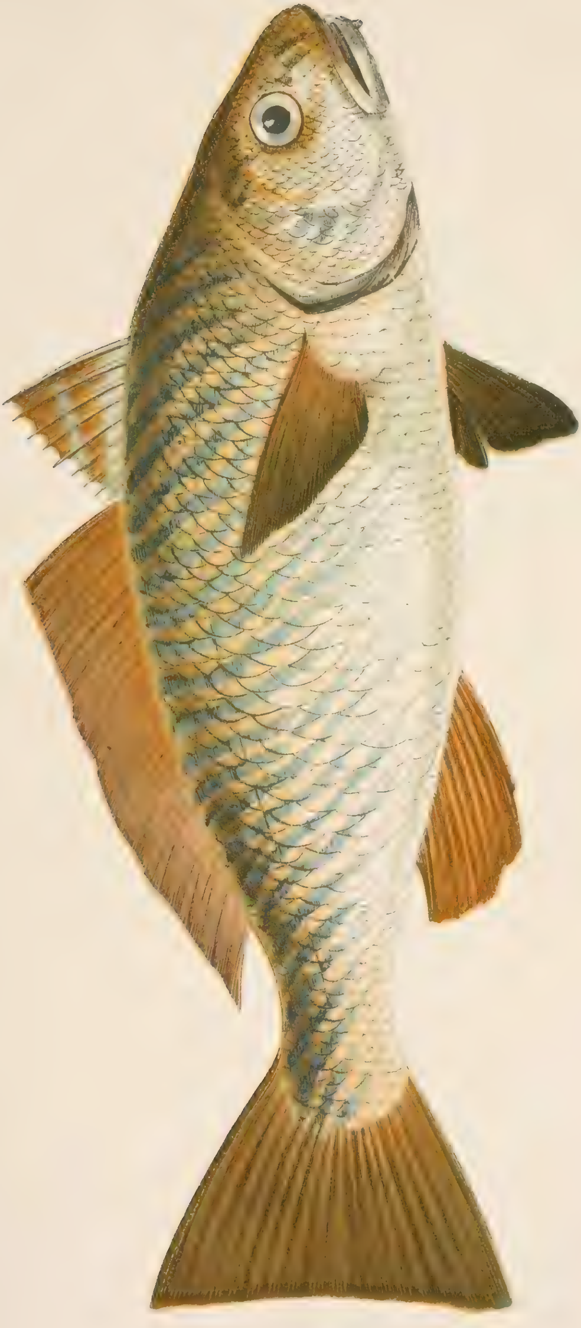
Cuvier remarks, that in external characters, the family of which the genus *Umbrina* forms a part, displays but little difference from that of the Perches, among which fishes a portion of them have been arranged by some authors. Nor are the distinctions easily made, although they have been sufficiently well marked to influence the decision of Cuvier himself, as well as of other leading naturalists; whose arrangement we follow the more readily as the species of these scienoid fishes—which are so called from *Sciæna,* another of the genera belonging to this family—that wander to our coast, are but few, and of uncertain and rare occurrence.

The fishes of the genus *Umbrina* have the body compressed and somewhat lengthened; the upper jaw overtopping the lower, furnished with fine teeth, with none on the palate. The head covered with small scales, the body with scales of larger size. Cheeks without plates, but the covers moderately armed and serrated. Two dorsal fins; a short and thick barb beneath the lower jaw. This genus ranks with the thoracic fishes of Linnæus.

UMBRINA.

Umbra,	Gesner's Nomenclator Piscium, p. 53.
Sciæna or Umbra,	Jonston. He adds the Glaucus, of Belon.
Umbrino,	Willoughby; p. 299, Tab. S. 21.
Sciæna cirrhosa,	Linnæus.
Umbrina cirrhosa, and vulgaris,	Cuvier. Yarrell; British Fishes, vol. i, p. 109.
Perseque umbre,	Lacepede. Risso. Jenyns; Man., p. 353.
" "	Gunther; Cat. Br. M., vol. ii, p. 274.

This fish is well known through the whole length of the Mediterranean, and from the coast of Spain is met with so far south as the West Indies; but it seems to avoid colder climates, and has only once been recognised in the British Islands. In the Minutes of the Proceedings of the Linnæan Society for 1827, November 20th., (vol. xvi,) a letter was read from John Cresswell, Esq., F.L.S., giving the information that a fish



unknown to the oldest fishermen had been taken in the River Exe, weighing one hundredweight, and proving identical with that known at Gibraltar by the Spanish name of Umbrina, (*Sciæna cirrhosa*, Linnæus;) but a particular description of this example does not appear to have been published or taken. For its habits, therefore, as also for a figure, we are compelled to have recourse to writers who have possessed better opportunities of observing it than ourselves have been so fortunate as to meet with.

It was well known to the ancients, who appear to have been more observant of its habits than the moderns, for the latter have often confounded it with other fishes; and by the former it obtained the name still applied to it, and which signifies a shade, whether because of the shadowy tints it sometimes bears, or from the dusky colour it sometimes assumes; on which account Ovid describes it as *Corporis umbra liventis*. But the Umbra of Ovid must be distinguished from a fish of the same name mentioned by Ausonius, and which inhabits fresh water,—in fact the Grayling, which, says Izaac Walton, was called Umber from his swift swimming or gliding out of sight, more like a shadow (which the word *umbra* signifies) or a ghost than a fish.

According to Pliny and others, copying Aristotle, the Umbrina was supposed to be quick of hearing, and also sensible to cold, which the first-named philosopher believed to be properties that belonged to all fishes which were in possession of ear-bones: a supposition, however, which does not appear to be universally correct. If we may trust Oppian, an occasional method of taking it would shew it to be possessed of a low amount of intelligence, for he represents them as falling an easy prey to the diver, and only defended by the erected spines of what we must suppose their dorsal fins, from the formidable nature of which Ovid terms the Umbra the Horrid Fish.

"The Shade Fish swift with conscious fear implores
The kind protection of his native shores;
Some hollow cave or sea-green weed he seeks,
Delves in the slime, or nuzzles in the creeks.
But studious only to conceal his eyes,
Careless of other parts, exposed he lies,
Irrational! and hugs th' assuming pride,
To think he gives the night to all beside.

> The fish, in careless ease supinely laid,
> The diver's grasping fingers swift invade;
> Up from the deep he springs, and shews his prey,
> Torn from his cave to gasp his life away."
> OPPIAN. B. 4.

According to Columella it was one of the fishes that was kept in their salt-water ponds by the Romans.

It is with the intention of furnishing observers with means by which they may be able to decide on the presence of this fish, if it shall be found again to visit our coasts, that we borrow our description, with a figure, from Willoughby, whose observations were obtained from the examination of recent examples in the Mediterranean. The specimens he met with did not exceed the usual size of a Carp, to the general form of which he supposes it to bear a likeness; but Belon described it as attaining the weight of sixty pounds, and a length of five or six feet. We see above that the English example was heavier even than this. The shape is somewhat compressed, narrow at the back, and rising higher behind the head, but growing more slender behind. The lateral line runs along the middle of the side, but is bent near its origin and termination. The scales of the body are of good size, with incised edges, but on the head they are small, and extend over the gill-covers and to the mouth. The middle border of the gill-cover is serrated; (Lacepede says there is a spine on the hindmost gill-cover.) The under jaw short; gape moderate; teeth very fine and slender. The barb on the under jaw is so short as by Rondeletius to be termed a wart. The dorsal fins two, very close together; tail straight or slightly curved. The general colour yellow; the sides beautifully adorned with circles or curved lines, in their course turning towards the head, their colour leaden and pale yellow interchangeably: (in some instances a fine blue, becoming white lower down; a black spot on the border of the gill-cover; pectorals, ventrals, and tail dark; anal reddish; dorsals brown, with two longitudinal white bands on the first dorsal.)

There is some confusion in the writings of Willoughby and Ray in their accounts of this and kindred fishes; but there does not appear any reason to doubt that the species described by Willoughby at page 300, under the name of Umbrino, is the same with his Umbra as referred to above, but which he seems to confound with the true Sciæna or Maigre, the latter not being otherwise mentioned in his work. He describes it as having a pointed snout and large mouth; the teeth rough in the jaws, but none in the palate. Nostrils wide; on the lower jaw five pores, and eight on the upper. From the head to the dorsal fin a beautiful light blue, with lines or streaks from the middle of the back obliquely forward, and alternately dusky and pale blue, growing paler in their descent. Fin rays of the tail yellow, becoming black near the end, the lowermost altogether black; ventral fins as if dipped in ink.

Fin rays—first dorsal nine or ten, second dorsal twenty-three, pectoral fifteen, ventral six, of which the first is a spine, anal eight, the first also spinous.

SCIÆNA.

This genus differs from *Umbrina* in having the jaws equal, and the lower jaw without a barb. Spines of the anal fin weak.

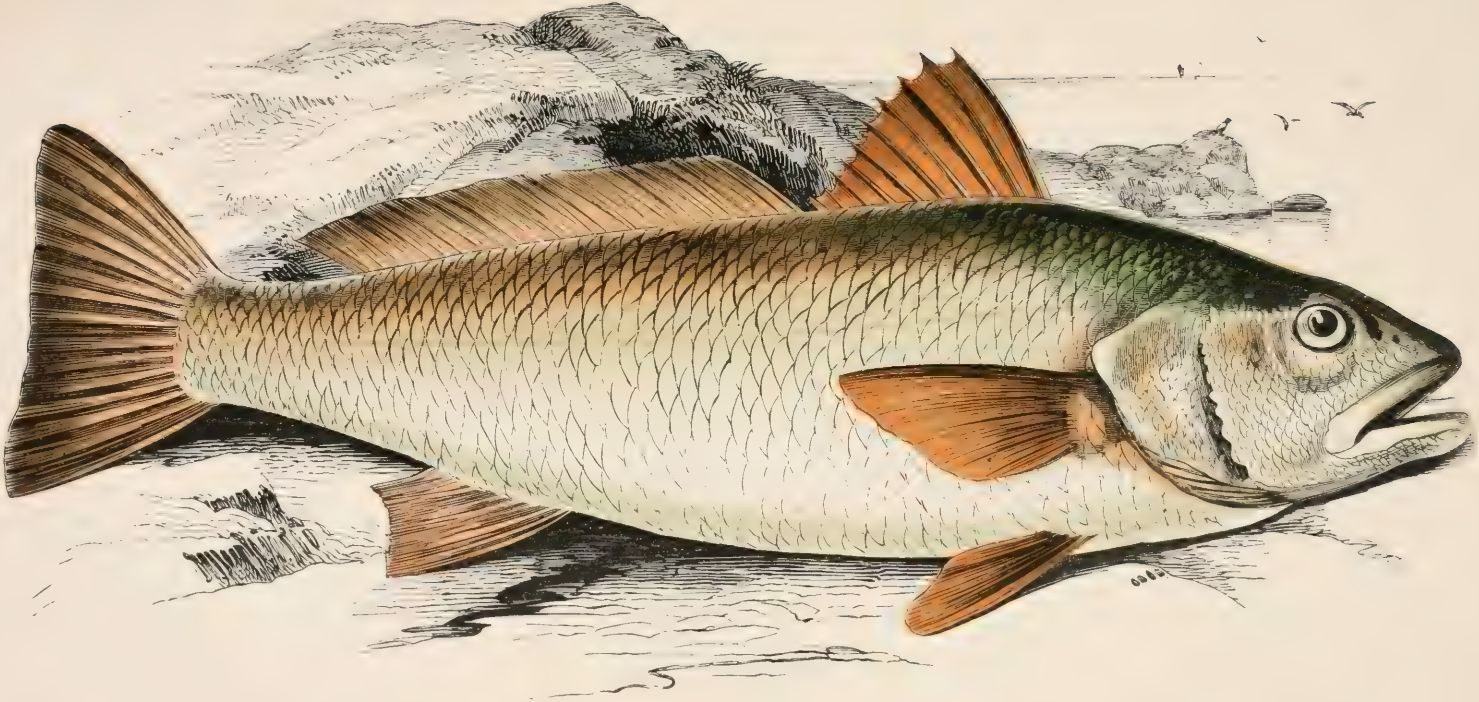
It may seem unnecessary to divide these fishes, so very like each other, into separate genera, especially on grounds which appear to be so slight and indistinct. But it should be considered that in the warmer portions of the ocean, the species in both of them, as well as of other genera of this family of which no examples have been known on our coasts, are numerous, and that therefore it suits the convenience of naturalists to have them divided into acknowledged groups, although the characters on which such a division is founded would under other circumstances be deemed insufficient.

SCIÆNA.

SHADE FISH. MAIGRE.

Sciæna umbra,	Linnæus. Cuvier; Animal Kingdom, but *S. aquila* in his History of Fishes.
Sciene umbre,	Lacepede. Risso.
Sciæna aquila,	Fleming; British Animals, p. 213.
" "	Jenyns; Manual, p. 352.
" "	Yarrell; British Fishes, vol. i, p. 104.
" "	Gunther; Cat. Br. M., vol. ii, p. 291.

In our account of the Umbrina we have hinted at the confusion which exists, especially in the writings of the more modern naturalists with regard to that fish in connection with the Sciæna, as well as in reference to others nearly related, or to themselves in different stages of their growth. There can be little doubt that one source of this confusion is to be found in the similarity of the names applied to these fishes, for although Umbra and Sciæna have a difference of sound, they possess a similarity of meaning; and when a distinction of meaning is applied to them, the difference has been made to apply to the stages of their age and growth, rather than to the natural



SCIÆNA

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distinction of the fishes. Rondeletius informs us that the fishmongers of Rome were of opinion that the fish known by the name of Coracinus was a smaller size of the species which they termed the Umbra, and that the fish Latus was the same when it had reached its largest growth. Gesner, after quoting this authority, goes on to say that the Umbrina, of which he has given a characteristic figure, is the same with that to which the French have assigned the name of Maigre, and in this he is supported by the opinion of Lacepede, and which name he supposes it to bear from the pale appearance of its flesh, as if it were emaciated and bloodless. The Peis Rei or Royal Fish he supposes to be the same with the Latus, which he regards as not to be distinguished from the Umbra and Coracinus, although he had said before that the Umbra was furnished with a wart or tubercle on the chin, which the Coracinus and Latus did not possess. This author also refers to Rondeletius as assigning to the Umbra its characteristic marks of oblique lines of golden and darker colour, which are said not to belong to the Coracinus and Latus; and there is no less a confounding of truth and error in the writings of Willoughby and Ray as regards these fishes, of which even Risso is not clear.

It is by having recourse to the work of Lacepede, that we are the more effectually assisted to find our way out of this confusion, and to enable an observer to decide upon the distinction of these fishes when again found wandering to our shores. It is to be desired, however, that to avoid further confusion, the name of Maigre ought not to have place among the English names, for assuredly such a denomination must be inappropriate for a fish that is generally robust, and adorned with such resplendent colours as will not fail to attract the admiration of an observer. As definite marks of difference between this species and the Umbra, besides those diagonal lines or shades which ornament the sides of the latter when in its highest beauty, in the former the jaws are of equal length, and without a tubercle or barb at the chin. Serrations on the foremost of the gill-covers will usually be less distinct in age, and they not unfrequently vanish in such a degree as to shew how little we can depend on them for distinction of this species when fully grown; but in its early growth, according to Lacepede, the Sciæna is marked with the posterior spine, without the serrations.

This fish not unfrequently comes to our waters in the summer and autumn, and sometimes in no inconsiderable numbers. Its great beauty of colour and boldness cause it to be much noticed by fishermen, and from them, in different seasons, I have obtained some interesting information as regards its habits. For a few years in succession, from 1849, they attended on the boats that were engaged in the Pilchard fishery on the south coast of Cornwall; and although they never attempted to take fishes from the floating nets, the eager Sciæna would dart greedily after any that fell out of them or were thrown to it, and in so doing its appetite could scarcely be satisfied. It would approach close to the boat for food; and this fearlessness it was that afforded observers the opportunity of discerning the form, size, and colours of these fishes; and by these means, compared with former opportunities of examination more at leisure, I was enabled to form a definite opinion of their identity. But the endeavours made to catch them proved for the most part unsuccessful, for their strength was in proportion to their swiftness and size, so that the best lines were snapped asunder with apparent ease, and they escaped capture, although perhaps they carried away their death with them in the several hooks of the fishermen. I have had an opportunity of examining two examples of this species as they came fresh from the water, and thus had an opportunity of making notes of their colour, which was alike in both instances; but a third which came under my notice in London, in company with my friend Mr. Yarrell, was without all this splendour of tints, so that the fish would scarcely have been recognised except by close examination. A specimen also which is described by Professor Nilsson, in Sweden, was also much plainer in colours, as we shall presently see, and thereby seems to afford a proof that a change of water or season will materially modify the appearance, as we know to be the case indeed with many other fishes.

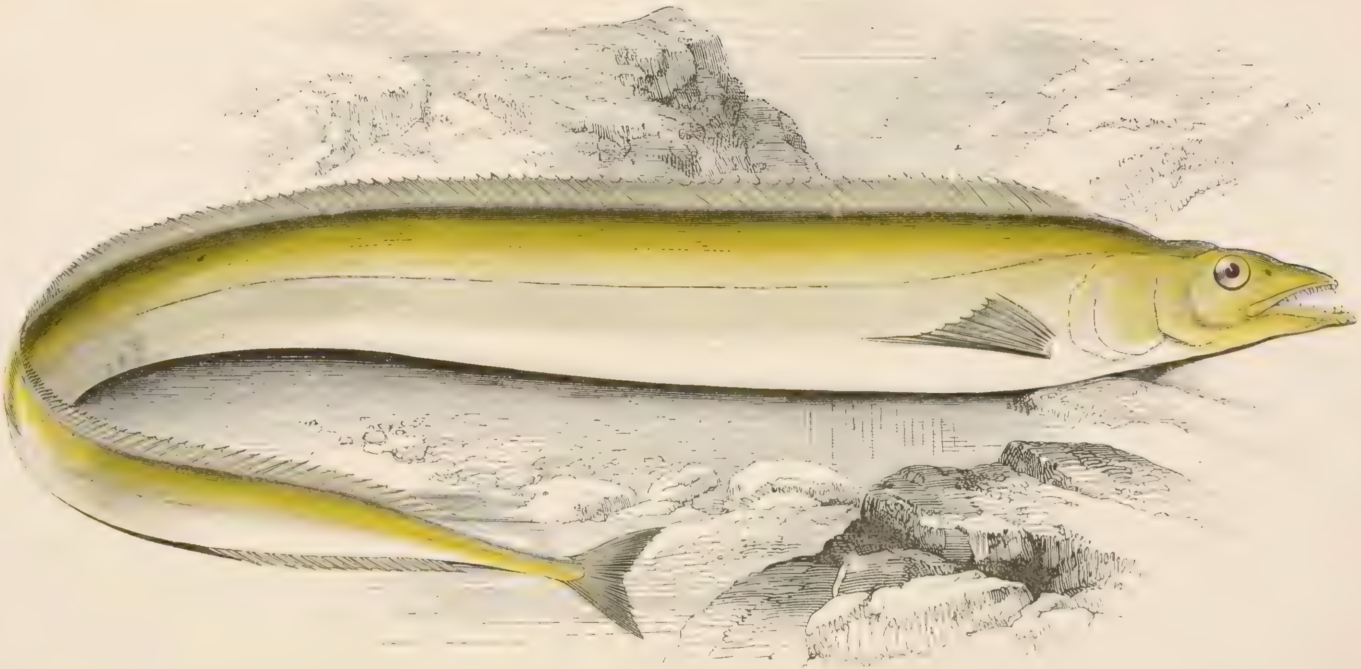
It appears that when these fishes come to our neighbourhood it is in scattered companies, and that then their wanderings are not confined within narrow bounds. Mr. Thompson, of Weymouth, had noticed the occurrence of at least a single one in that neighbourhood in one of the years above referred to; and Professor Nilsson records it as having been once taken on the coast of Sweden, which was in December, 1852, and so much later than it was seen in the British Channel, although in the same season. Long before this also an example is mentioned by Dr. Fleming, as having been taken so far north as the islands of Zetland. Little is known of the distinctive history of the Sciæna, beyond its fearless character and occasional propensity to wander, with eagerness in swallowing its food. For the table it is greatly valued, and in ancient times was more so even than at present; so that in Rome, even before the time of its highest luxury, the head and neighbouring parts were reserved for people of the greatest distinction.

The example described was one of two caught by fishermen of Polperro in the month of October; its length five feet, and weight fifty-eight pounds. The form is not much unlike that of the Bass, but rather more bulky; head rather short; the body moderately compressed, becoming more slender towards the tail. Head and body covered with scales, those of the body large, one of the latter that was separated measuring an inch and a quarter in breadth. The jaws equal; teeth fine, those in front shorter, and with an interruption at the symphysis of the jaw; eye moderately large; lateral line with a small curve in its progress. Dorsal fins two, the first with spinous rays, the second longer and lower; anal fin short; the tail even. Colour behind the head a sparkling green; back a bright copper; belly bright silvery; a fleshy gland-like substance at the root of the pectoral fin a fine brown. According to Risso the colours in the Mediterranean are even more brilliant than I found them, the head being variegated with golden, light blue, and pinkish purple, (amethystine,) with the fins yellow, black, and silvery. The example described by Nilsson was a silver grey, the back blackish, white below; fins reddish brown; length five feet, and the weight seventy-two pounds.

The number of rays in the fins has been counted with some difference. In the first dorsal there are ten; in the second twenty-four and twenty-nine; ventral six, of which the first is spinous; anal one or two spinous, and the remainder eight; pectoral from fifteen to seventeen; caudal eighteen or nineteen.

SCABBARD FISHES.

This family of fishes is distinguished by the great length of the body, which is thin and tapering, in some species having no scales, and when they exist they are of very small size. The jaws protrude much, and the cleft of the mouth is wide, with prominent teeth. The gill-openings are also wide. The dorsal and anal fins are long, and separate from the tail where the latter exists; the ventrals, which are seated under the throat (jugular) when there are any, are merely rudimentary; but in some species there are none. The Scabbard Fishes were by Cuvier classed among those which are termed Band or Ribbon Fishes, to which in their general shape they bear much resemblance. But on more strict examination they are found to differ in so many of their characters, as they appear to do also in their habits; and some of them partake so much of what may be called the aberrant forms of the family of the Mackarels, that it is thought preferable to depart in this instance from the arrangement of the illustrious French naturalist, and to adopt that which is pursued by Dr. Günther, in his newly-published "Catalogue of the Fishes in the British Museum."



SCABBARD FISH.

XXIII

LEPIDOPUS.

Body elongated and compressed; jaws projecting, armed with strong teeth; cleft of the mouth wide. Dorsal fin long, and with the anal fin separate from the tail, which is well marked. The ventral fins are represented only by a pair of moveable scales; from whence the name of the genus, which was formed by Dr. Gouan, professor of natural history at Montpellier, for the classification of a fish he had discovered, and which is the only species we know of this genus; unless it shall be determined, from the differences we have to point out, that Risso is correct in supposing that there are two to be regarded as positively distinct. According to Gouan, this fish is to be defined as having the body sword-shaped, of a silvery colour, with the head protruded, and furnished with three scales, two of which occupy the place of ventral fins, whilst the third takes the position of the anal. In the figure which he gives he represents the tail as lengthened into what is termed the lancet shape, in which he differs greatly from other observers, and from our own example especially; and it was on this account chiefly, although not solely, that Risso supposed himself the discoverer of a second species of this genus, which answers more directly to the fish we have to describe.

SCABBARD FISH.

SCALE-FOOT.

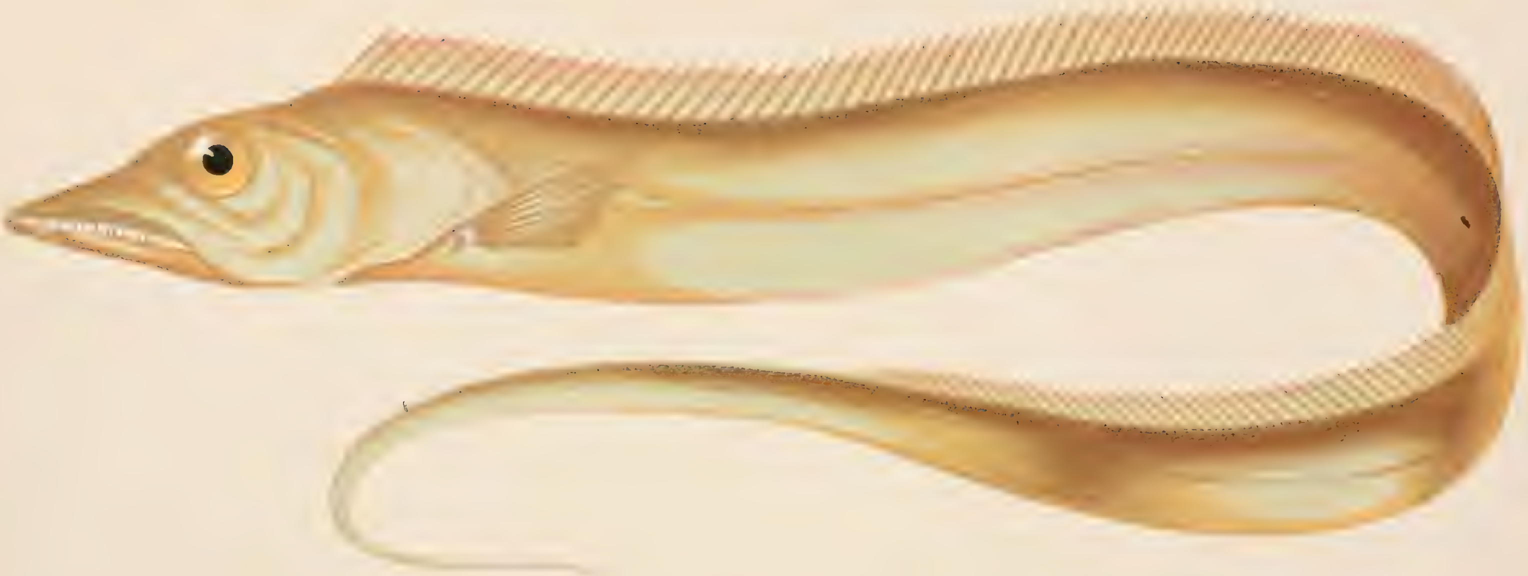
Lepidope Gouanien,	Lacepede.
" *peron,*	Risso; pl. 5, f. 18. *L. Gouanien?*
Lepidopus tetradens,	Fleming; Br. Animals, p. 204.
" *argyreus,*	Cuvier. Jenyns; Manual, p. 371.
" "	Yarrell; Br. Fishes, vol. i, p. 198.
" *caudatus,*	Gunther; Cat. Br. M., vol. ii, p. 344.
Scarcina argyrea,	Rafinesque; p. 20, pl. 7, f. 1.

The following are names by which it has also been described by authors whom we have not had an opportunity of consulting:—

Vandellius Lusitanicus,	Shaw.
Xiphotheca tetradens,	Montagu.
Lepidopus Lusitanicus,	Leach.
Lepidope Jarretiere.	Bonnaterre.

The Scabbard Fish has an extensive range, having been found as well at the Cape of Good Hope as in the Mediterranean and the British Channel. But it is scarce everywhere; which may be accounted for by the supposition that it usually keeps near the bottom in very deep water, from which it does not wander, except under unusual circumstances. Dr. Pappe, in his account of the edible fishes of the Cape of Good Hope, says that not more than three had been taken there in the space of six years. Montagu was so fortunate as to obtain two examples on the coast of Devonshire; and one of them was so small as to suggest the opinion of its having been produced within a short distance of the place where it was found. It has been taken in Ireland once, and I possess a record of four specimens which have been met with in Cornwall; and one of them, from which our figure was taken, is preserved in the Museum of Natural History at Penzance. It was caught at about twenty miles from land, and in length measured five feet four inches; the head long, behind it a protuberance, followed by a depression, from which the back rises to the dorsal fin; the body thin and tapering, becoming narrow behind the termination of the dorsal fin. The eye is large; the head in front of it tapering to the jaws, which protrude; lower jaw longest; teeth projecting, curved, those in the upper jaw longest. Lateral line straight. Dorsal fin single, even, narrow, rising rather before the border of the gill-covers, and ending distinct from the tail. Anal fin comparatively short, passing slightly nearer the tail than the dorsal. Tail small and forked. Pectoral fin of a remarkable shape, the shortest rays being above, and regularly increasing in length to the lowest, which is double the extent of the uppermost ray, thus appearing like a fin turned upside down. The vent is at the middle of the body. The colour above was greenish, with a tint of blue; below white: but it appears to vary in colour. Dr. Pappe says the colour of the back is faint steel blue on a silvery ground, the whole surface sprinkled with a silvery dust; to which Risso adds that the surface reflects tints of golden, pink, and blue. It is said to swim with a very swift and waving motion; and Dr. Pappe adds, that he found its flesh fine and delicious.

Risso reckons the fin rays as—of the dorsal two hundred, the anal twenty-two, pectoral twelve, and caudal thirty-six.



HAIRTAIL.

LXXVIII.

TRICHIURUS.

In the form of the body, mouth, and dorsal fin, this genus bears great resemblance to the last; but it differs from it in the absence of the tail; and everything like a ventral fin. In place of an anal fin there is a row of very small spines, and the body at its termination is extended into a slender and compressed cord.

HAIRTAIL.

BLADE FISH.

Lepturus,	ARTEDI.
Trichiurus Lepturus,	LINNÆUS. CUVIER. BLOCH; pl. i, 58.
" "	SWAINSON; Nat. Hist., vol. ii, p. 254.
" "	FLEMING; Br. Animals, p. 204.
" "	JENYNS; Manual, p. 372.
" "	YARRELL; Br. Fishes, vol. i, p. 204.
" "	GUNTHER; Catalogue of the Br. Museum, vol. ii, p. 346.

THIS species was first made known to science by the joint labour of Artedi and Linnæus; the first of whom has given a particular description of it, to which we shall again refer. To this Linnæus has added that it is a native of China and America, and has been known in many instances to have leaped out of the water into the boats of fishermen. It is now known to be found in the seas of the West Indies and South America.

As regards our own country the history of this fish is obscure, and not at all satisfactory. Mr. Hoy was the first to obtain an example, which with some probability he referred to this species; but it was much mutilated by a storm that threw it on the shore in the Firth of Moray, in November, 1810. Quoting from his account in Dr. Fleming's "History of British

Animals," he says, "Its head was much broken, the bones of the upper part of the head still remained, and the sockets of the eyes were distinguishable very near to each other; the extremity of the upper jaw, or upper part of the mouth, was entire; upon either side of which was an operculum. The length of the head could not be measured exactly, but was about eight or nine inches. The body from the gills to the point of the tail was three feet two inches long; its greatest breadth six inches and a quarter, and its greatest thickness only an inch. The vent was two inches from the gills; these were much broken and partly gone, so that the number of rays could not be ascertained. Both sides of the fish were wholly white, without a spot upon them; the dorsal fin was the only part of a different colour, being a blackish green: this fin ran all along the back from the gills to the tail, consisting of a great number of rays, soft, and little more than an inch long. Each of the pectorals had six double rays. There were no ventral nor anal fins, but the belly was a sharp, smooth, and entire edge. The tail ended in a point, consisting of three or four soft spines or bristles, of different lengths, not exceeding two inches. The body was nearly of the same breadth for one half of its length, and then its breadth diminished gradually till within three inches of the tail, when the diminution became more quick. The lateral line was straight, and strongly marked along the middle of the two sides."

It is remarkable that in November, 1821, the same gentleman had an opportunity of examining an example of what he supposed to be the same species, which had been thrown on shore near the same place; but as, after the entire loss of its head, what remained measured twelve feet nine inches, with a breadth of eleven inches and a quarter; the distance from the gills to the vent measured forty-six inches, the lateral line was straight, and the tail ended in a blunt point without bristles, we confidently question whether this example at least ought to be referred to the species under consideration, or even to the same genus. We add some notes from Artedi, in order to shew that the description and figure derived from a Cornish specimen, belongs, beyond question, to the same fish that he describes. Head compressed, lengthened; produced into an eminence behind, broad between the eyes; body long, narrow, and thin; tail long, slender, pointed, and without a fin; above and below sharp. Vent much nearer the head than the tail; opening of the mouth cut far back, but not capable of being thrown very wide. Lower jaw pointed, longer than the upper; nostril single, open, nearer the eye than the snout; eyes rather large, nearer the snout than to the border of the gill-covers, which latter are oblong. Gill-openings very wide, reaching nearly up to the end of the lower jaw. Teeth in a single row, of irregular height and distribution; lateral line wide, beginning on the upper border of the gill-cover, but bending down towards the pectoral fin, and thence straight backwards. Dorsal fin very long, beginning at the back of the head, and ending without approaching the extremity of the body. In place of an anal fin, from the vent backward, a number of slender points, of which those behind are directed forward, and those nearest the vent are directed backward. The tail is long and slender, compressed, and pointed.

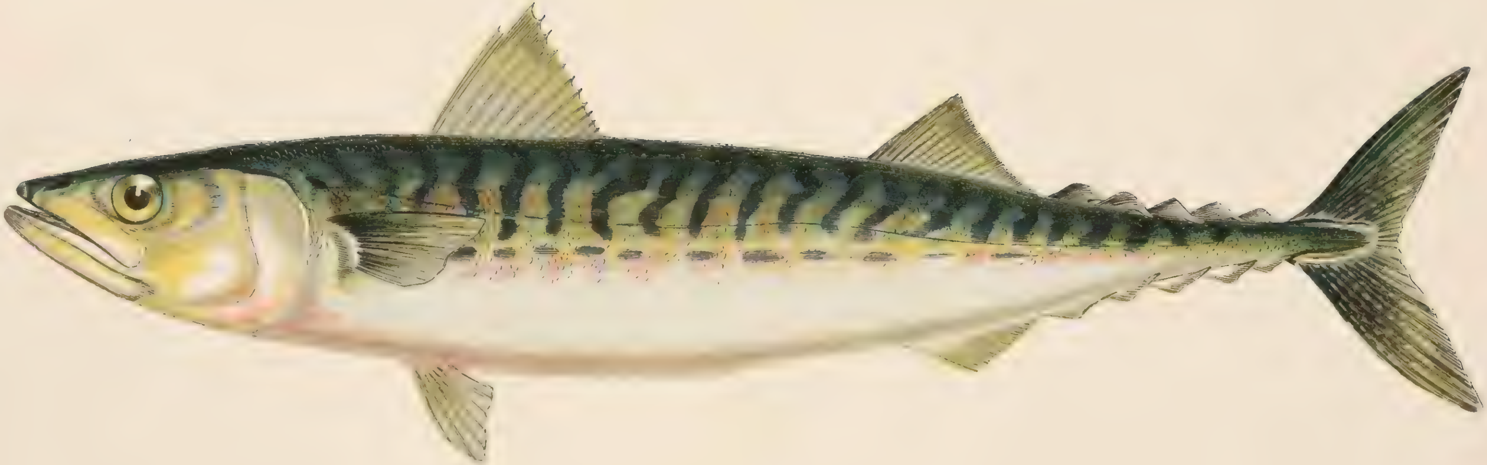
The example we have the pleasure of introducing to the notice of the reader, and of which our figure is the only representation that has been derived from an undoubted British specimen, was thrown on shore on the sand of the Whitsand Bay, near the Land's End, in Cornwall, in the month of April, 1853; and was only defective in the loss of that slender portion which was behind the dorsal fin, and which appeared to have been bitten off. Exclusive of this it measured about two feet three inches; depth at the pectoral fin two inches; at the termination about five eighths of an inch; from the point of the under jaw to the vent twelve inches and a half; thus remarkably distinguishing it from the example described by Mr. Hoy, where in a fish three feet two inches in length the vent was distant only two inches from the gills. From the point of the upper jaw to the eye two inches and a quarter; the eye large, high on the side of the head; under jaw longest, slit of the mouth far back. Teeth long, irregular, scattered, locking together; one at the extremity of the lower jaw prominent, and not received into the mouth. Border of the gill-cover running back into a pointed oval, five inches and six eighths from the point of the snout. Lateral line begins high over the gill-covers, and descends gradually at about the end of the pectoral fin; from thence straight to the tail. Pectoral pointed, two inches and three eighths long. The back rises from the head to the origin of the dorsal fin; and this fin begins above the border of the anterior gill-cover. The colour from the point of the jaws, along the back, brown; a lighter brown on the hinder portion of the body; gill-covers and sides inclined to blue; margin of the body, to the vent, pink; pectoral fin tinted with blue; dorsal with a tinge of reddish brown; iris yellow.

THE MACKAREL TRIBE.

Such of the Mackarel tribe as visit or frequent the British seas constitute a well-defined family, the form and habits of which render them easily distinguished from all others of our native fishes. They are capable of great activity, for which the shape of their bodies and the distribution of their fins eminently fit them, the fore part of the former being of an almost conical shape, by which they are rendered well fitted to make their way through an opposing fluid; while the hindward portion is so lengthened into a rounded slope as to cause the water to glide past without forming an eddy that might interfere with the smoothness of their course. The requisite flexibility is secured by the smooth texture of the surface of the body, on which the scales are so small and even as to be scarcely perceptible; and in some of the species the pectoral fin is received into a depression of the surface, where it can lie hid when a sudden and rapid rush is to be made, while the most prominent of the dorsal fins falls into a cavity or slit, so as to be concealed when its special duties are not required.

The tail in fishes is the great organ of propulsion, and in its true nature consists of two lobes which are united in the middle, but in this family with an obvious degree of separation. Each of these lobes is capable of an action that is reciprocal or independent of the other, by the sudden and impulsive motion of which the water itself is constituted a fulcrum on which each lobe of the tail is brought to bear, in the same manner as with a single oar over the stern of a boat it is driven onward, by what, in nautical language, is termed sculling. A forked tail is better fitted to act powerfully in this mode of progression than a round one, although the latter may in dimensions include a larger space; and by the former the influence of turning is more quickly and powerfully brought under the action of the will. Belon makes the curious remark, that a forked tail is always accompanied with a pectoral fin that is (more or less) pointed, which observation, although not in every case correct, is nearly so; and taken together with the number of lesser fins on the hinder parts of the body, the fishes thus furnished are rendered the best qualified of all the tribes of the ocean to pass rapidly through a large extent of space, and suddenly to change their course as hope or fear may render expedient.

This family was regarded as a single genus by Linnæus, and was arranged by him in his Thoracic order; but by Cuvier it has been divided into several genera, of which we shall take notice as we proceed to describe the separate species.



MACKAREL

LXXIX

MACKAREL.

Scomber, Scombrus,	JONSTON.
" "	WILLOUGHBY; p. 181, tab. M. 4.
Scomber scomber,	LINNÆUS. CUVIER. BLOCH; pl. 54.
" "	DONOVAN; pl. 120.
Scombre maquereau,	LACEPEDE. RISSO.
Scomber vulgaris,	FLEMING; Br. Animals, p. 217.
" "	JENYNS; Manual, p. 360.
" "	YARRELL; Br. Fishes, vol. i, p. 137.
" "	GUNTHER; Cat. Br. M., vol. ii, p. 357.

THE Mackarel is one of our best-known fishes, highly valued for the table, and, in consequence, an object of importance to fishermen, who employ much cost and anxious labour in pursuing them throughout the coasts of the British Islands, and for a considerable distance into the ocean. These fish occupy a wide extent of sea; for they are known along the waters of the Northern States of America, as also the whole of those of Europe, the southernmost point beyond which they have not been met with being the Canary Islands; although even a wider range than this has been assigned to them by observers who had not learnt to distinguish between our Common Mackarel and a kindred species. But wherever found they shew themselves an ever-wandering race, which, in addition to a habit of periodical movement, are led by other impulses to be continually shifting their ground, and thus render the pursuit after them one of the most uncertain that can be imagined. Some indeed are to be found on the coasts of Britain in every month of the year, and at irregular intervals they have thus occasionally become abundant; but in winter these are for the most part scattered individuals that differ in many respects from the schools which are sought for by fishermen in the early months of the year. It is in January or early in February that what are called the *right* fish being to move from the deeper waters of the Atlantic, to which they had retreated towards the end of autumn; and as at this their early movement, their value to the fisherman is much higher than afterwards, preparations are made to meet them at a considerable distance from land—at the entrance of the British Channel, south or west of the Scilly Islands, or towards Cape Clear, in Ireland—amidst the uncertain weather and darkness of the night, which render the voyage a service of no slight labour and hazard. Such is the most frequent course of proceeding, but it has sometimes happened that the fish have shewn themselves near the western shores at an earlier date than was expected, in which case those who have laboured the least have obtained the greatest success. I possess notes which record that in the year 1818, fifteen thousand were caught at Mevagissey, in Cornwall, between the 1st. and 12th. of February; and in the year 1842, on the 30th. of January, two boats brought into Plymouth—one of them fourteen thousand, and the other four thousand. In 1843 some boats succeeded in taking from twenty to thirty thousand in each night of the first week in February.

There is reason to suppose that the fish thus first sought for, which obtain a preference in the market, are the produce of the last, or next to the last season of breeding; and the moderate progress they have made in growth during the small time of their retreat, if the supposition of their being the progeny of the last season be allowed, is not a very formidable objection to the opinion. By their inferior size and general appearance they may without difficulty be distinguished from those of advanced age, and which especially are more distinctly marked with an interrupted dark line along the side, which therefore is regarded—even when it occurs in younger individuals—as a sign of inferior quality.

I have had occasion to remark that in this early movement the sexes are much divided, and that the males go before the females in their course of migration. Out of twenty examples, taken indiscriminately in March, sixteen were males; and in another season, from a capture of seven thousand, seventeen out of twenty were males. It is true I have witnessed an exception to this, when in numbers selected from the earliest fish, they consisted of an equal number of each sex.

But further examination tended to shew that this apparent exception tended strongly to establish the rule. The whole of the school thus taken were confidently pronounced by the fishermen to be other than the "right" sort; that in fact, they were the old fish of a former year, that had not sought the retreat of deep water, or were pursuing an irregular course of action. It may here be proper to remark that instances have been noticed where both sexes have been united in one individual. A lobe of roe has been found lying between the usual pair of lobes of milt; and in many sorts of fishes it is probable that similar instances are not uncommon.

It does not depend on the weather only that sometimes these early Mackarel appear within the reach of the fishery in the first few days of February, for they have abounded when the weather was cold and stormy, and even when a brisk east wind—the most ungenial for all kinds of fishing—has been blowing; but a particular temperature, or the direction of the wind, will have an effect of causing them to swim higher or lower in the water; in which case they may pass along the accustomed districts without their presence being discovered, to the great loss of the fishermen, who, in this, as in many other instances, must be condemned to labour most when they find the lowest amount of reward. It is on those occasions that they have been found first in the eastward portion of the British Channel, where otherwise they would not have been met with until towards the latter part of April or May; and the great body of them in this case may be expected to return to the coasts of Devon and Cornwall, as if the passage had been in its origin from the German Ocean. It may be owing to casual deviations like this from their usual course, that some naturalists have been led to believe that the Mackarel was more particularly a native of the little-known regions of the Frozen Ocean, where they have been represented as revelling on an abundance of food, amidst an intensity of congenial cold and storm; and from whence, at a time when we should have judged that, if at all, the northern sea was best fitted to their nature, they have been said to depart in immense multitudes to supply an esteemed article of food to nations further to the south. The same account was formerly accepted as regards the Herring, and from the same authority; but in the last-named instance it has been disproved, and it is no less imaginary in reference to the Mackarel.

Dr. Edmonson, in his view of the Zetland Islands, informs us that they only reach that coast in August, and continue no longer than about a month; and there are further proofs of the bounds within which they limit themselves, as well as the course they pursue, which is particularly pointed out by the time and manner of the fisheries which are carried on for the purpose of taking them. These we find to differ in time only, according to the manner in which the fishing is conducted, the adventurous spirit of the fishermen, or the distance of the place from that portion of the sea from which they are expected to come. Large numbers of boats, both French and English, from the eastmost and narrow parts of the British Channel, assemble at Plymouth early in the spring, for the purpose of seizing the occasion which the weather may afford them to shoot their nets at the entrance of the Channel; for, from experience, it is to the west, and not the east or north, they look for success. Risso says that this fishery is carried on at Nice in the spring; and Cuvier, that the season at Aigne Montes is in April, in Languedoc from June to August, at Fregus, in Provence, from May to October, and in the Black Sea and the Tauride it is in the spring as well as summer, when they are met in great schools coming from the west. They are not found to enter the Sea of Azof.

Recurring again to the north we are informed that in the Baltic the Mackarel at all times are few, and of small size; but, according to Professor Nilsson, ("Skandinavisk Fauna,"—Fiskarna,) although they are not commonly found south of Gothenburg, he has known them to come on the coast of Sweden, and in one instance in very considerable numbers. This was in the summer of 1851, when immense quantities were taken in the Sound, but they were so small that it required three to weigh a pound.

We may further remark of the Mackarel taken early in the spring, that they often differ in quality according to the season and place, a circumstance which may with much probability be ascribed to the variety of food they chance to meet with in their widely-extended excursions. In some parts of the Mediterranean they are described as being always small and dry; and such appears to have been the case in ancient times at Rome, where, in their fresh condition, they were disregarded. As they were sold by fishmongers wrapped up in paper which was fit for no other use, a sarcasm was directed against inferior poets, that their works would be applied to the use of wrapping up Mackarel. Risso, on the other hand, praises the Mackarel taken at Nice for its superiority of size and flavour; but we believe that in no district will any be found to excel, and few to equal those which visit the west coasts of the British Empire.

The number of boats engaged in this early fishery is uncertain, but about two hundred have been known to assemble at Plymouth at one time, and upwards of that number belong to Cornwall alone. They are manned by from five to eight men in each; and the string of nets is formed of several portions that are capable of being taken asunder; and an ordinary boat will be supplied with fifty of these nets, of which each shall measure twenty-two fathoms as prepared for fishing, so that when shot or cast from the boat they may reach to the extent of a mile and three quarters. The size of the mesh is calculated to spread twenty-six to a yard, and in the usual depth of about three fathoms there are expected to be one hundred and twenty meshes. They are made to swim by corks which are set along the head-rope, the weight of the net itself being sufficient to cause them to sink to the proper depth; and in this condition they are cast across the expected course of the fish, while by a rope or hauser passing to the bow of the boat, they are kept stretched out, without the risk of being folded together by the influence of the wind or tide. They are thus shot or cast into the sea as the evening comes on, and again lifted in after two or three hours, and to ease the labour of this last fatiguing work, which is doubly difficult when the nets are loaded with fish, a capstan is employed, each division of the net being separated and stowed away as it is drawn into the boat. Another cast of the nets is usual toward the morning; for it is found by experience that, for fishes in general, the most successful time for their entering into a net is about the passage from day to night, or the reverse. It is a supposition of fishermen, that Mackarel are subject to dulness of vision at the beginning of the season, by reason of which they become entangled in the net more readily than afterwards; and it is remarkable that a similar remark has been applied to the Tunny, and other fishes of this family.

It is an important object with English fishermen to bring their fish to market as soon as possible, for the Mackarel soon suffers loss in its delicacy for the table, and a higher price is obtained in proportion to its freshness. There are other reasons also why delay and interruption would be productive of ill consequences, and therefore the good sense of the generality of fishermen has taught them to combine together, to sacrifice a little for the advantage of the whole. They are aware that, if at a time when fishing is pursued with success at a large distance from land, with perhaps the wind against them, each boat were compelled to run into port to obtain a market, a large portion of their most valuable time would be rendered unproductive; and on their return to the spot where they had expected to meet again with success, they might discover that the wandering disposition of these fish had carried them far away, with the consequent loss of a whole season. It is usual, therefore, for several boats to agree together as associates, so that each one in its turn shall receive the captures of all the others, and carry them all to market; returning again with all haste in order to be entitled to an equal share of the success obtained during its absence.

French vessels engaged in this fishery are usually much larger than the English, and more abundantly manned; and the success of their fishing depends on a different principle from that of the latter. With us but little use is made of salted Mackarel; and none are so preserved unless from delay in the sale they have become unfit for other use, or where the market is distant; as in some parts of Ireland. But with the French this is the principal object of the voyage, and therefore as soon as caught, the fishermen set themselves to the work of preserving them; which they do, first by a cross slit at the vent to extract the entrails, and then by salting them in bulk in the hold. When a loading is thus secured they hasten to port, and it may happen that two or three successful voyages may be accomplished in the course of a season.

Towards the end of May the Mackarel has become loaded with spawn, and in the course of the following month they approach the shore for the purpose of shedding it. They may then be seen in schools in rapid motion, sinking, and again rising to the surface; and shewing by the liveliness of their actions, that this process of nature is one of exquisite enjoyment. But it is to them a time also of great danger, which they make little effort to avoid. Seans are now brought into action, and a huer is appointed, whose station is on some commanding eminence, where he watches for the appearance of the school. On a signal given the fishermen haste to their post and prepare to act. We shall describe the nature of a sean more at length when we speak of the Tunny and Pilchard; but for the present it will be sufficient to remark that the sean for Mackarel is about one hundred and fifty fathoms in length, and nine fathoms in depth at the middle or bunt, and seven fathoms at the ends; these proportions being necessary in order to allow of its being so swept in the action of tucking, as to enclose and raise the body of fish to the surface. The meshes are so small as to prevent the fish from being entangled in them. The head-line is buoyed aloft with corks, and the bottom carried down with leads. Two boats are employed, of which one carries the sean, which is shot in a circle round the fish, while the other keeps the loose end steady, and by at last closing the ends, shuts up the fish as in a pond. The Mackarel is an active fish, and might effect its escape before the ends of the sean could be brought together, so as by the operation of tucking, to bring the body of fish within the reach of baskets, by which they are taken into the boats. To prevent this, therefore, one or two of the men are kept employed in plunging stones, prepared for the purpose, into the opening, by which means the fish are hindered from advancing, until the only possible outlet for escape is closed against them. This mode of fishing affords an occasion of much interest and excitement to a spectator, as well as to the fishermen, and some remarkable instances in it are recorded. The season lasts for about a couple of months, at the end of which the fish have again separated into smaller companies, and the line and hook remain the only effectual method of fishing.

The persons engaged in this last-named method of taking Mackarel are usually a different class from those engaged with the sean, and it is also frequently followed by gentlemen, for the sake of the excitement that attends it. The line is the same which is used for ordinary fishing at sea, and it varies in length from ten to twenty fathoms; but, as rapid motion is required, with the boat under sail in a sufficient breeze, it becomes necessary to keep it at a proper depth by means of a lead, of which the best form is that of a cone or sugar-loaf; and close above this is fastened an outrigger of wood, at the end of which is fastened a snoozing, which bears the hook. The object of this is to cause the bait to be influenced to an amount of action which shall resemble a living object, for the Mackarel will not readily attempt to seize that which seems without life, and its pursuit of prey at all times appears to be under the influence of sight rather than of taste or smell. Whatever shall display a shining action in the water will serve the purpose, and a slip of red leather, or portions of the stem of a tobacco-pipe, are employed with success. The more usual bait, however, is a slice cut from the side of the Mackarel itself, near the tail, and placed on the hook in such a manner as to assume the imitation of an active fish by an undulating motion in its progress through the water. Fishermen observe that they are more successful if several lines are brought into action at the same time, by which means, if the fish are abundant, at least one or two which have taken the hook shall be dragged along, and shew the course in which the boat is proceeding. The supposition is that the fish still at liberty are thus guided in the right direction by following their fellows, which otherwise they would not be found to do. Several hooks are sometimes placed in succession near each other, the better to arrest a passing fish, and with good success.

Wallop Brabason, Esq., in his work on the "Fisheries of Ireland," informs us that (I suppose in the north of that country) the season is from about the end of June to the latter part of September; but he makes no mention of the sean for catching them. With regard to the line he recommends for the lower part finer twine than fishermen are accustomed to employ; and with more than one hook,—the hindmost, even without a bait, being placed two or three inches behind the first; by which contrivance those that follow the bait will be caught, when perhaps they may not have an intention of actually seizing it. This last method is certainly more successful than that usually employed by fishermen, with a single hook.

But Mackarel will also sometimes remain at the bottom, where they are fished for with a boat at anchor; and I am informed that when thus situated, they may be drawn upward by the excitement of bait prepared for the purpose. A quantity of salted Pilchards that have become rancid, are bruised to a pulp, and hung over the side of the boat in a basket, the droppings of which, by the action of the sea, offer an allurement they are not able to resist.

It sometimes happens that the usual habit of the half-grown fish, of retiring into deep water on the approach of winter, is so far interrupted, that they remain on the western coast even so late as December and January, when they fall an easy prey to the fishermen. In the year 1844, in the month of October, the boats of Mount's Bay succeeded in taking fourteen hundred thousand, for which they obtained about four thousand pounds. In 1848, also, there continued for two months in the same district a large abundance of small Mackarel; and in December, 1842, with January of the following year, many thousands, of the length of eight or nine inches, were caught among Pilchards. Besides a great number given to the poor, many were sold at a penny a score and sixpence the flasket.

There was a time when an extravagant price was paid for an early arrival of Mackarel in London, but the conveniency of carrige by rail has put an end to this, and reduced the benefit to the adventurers to a juster level. The average price of this fish through the season for seven years, as communicated by a fisherman, has varied from six pounds to nine pounds the thousand; and the numbers caught in a boat of rather less than the common size, with drift-nets, from fifteen to twenty-four thousand. But it will sometimes happen that more than the last-mentioned number will be caught in a single night.

It is a remarkable circumstance in the history of so strong and rapid a fish, that it not unfrequently becomes the prey to enemies which appear to be far inferior in these respects to itself. It is sometimes laid hold of by the sharp claws of the nipper crab, *(Polybius Henslowii,)* a species indeed of great activity, and which swims near the surface, and is prepared to seize any of the fishes which are there, until by the mere fatigue of terror, it causes them to yield to their fate. It is also the frequent victim of the sea lamprey, which by a circular action of its teeth, bores into the flesh, and devours the energies of its prey. I have known several instances of a lamprey of no more than six inches in length, to be thus taken in the act of inflicting a mortal wound on the Mackarel.

Among the ancient Romans this fish was only regarded for its use in supplying a sauce, which was held by epicures in high estimation. It was called the garum or sauce of the allies, and was made from the entrails of the fish, for the taking of which, to supply this article alone, fisheries were carried on in those parts of Spain and Africa which lay beyond the Straits of Gibraltar. It was sold at Rome at six thousand sesterces, or about forty-eight pounds for the quantity of two gallons; and we are informed that it was a source of considerable riches to the countries from which it was brought. Even the dregs of this precious luxury were valued as a sauce. The astronomical poet Manilius gives his own impression of this sauce:—

> "Could gluttons see, they would not bear the sight
> Of preparations for their appetite,
> Whilst blood and guts, in a polluted mass
> Lie mixed, and are corrupted into sauce;
> Till all the filthy gore's distilled to treat
> The fashionable palate of the great."
> B. 5.

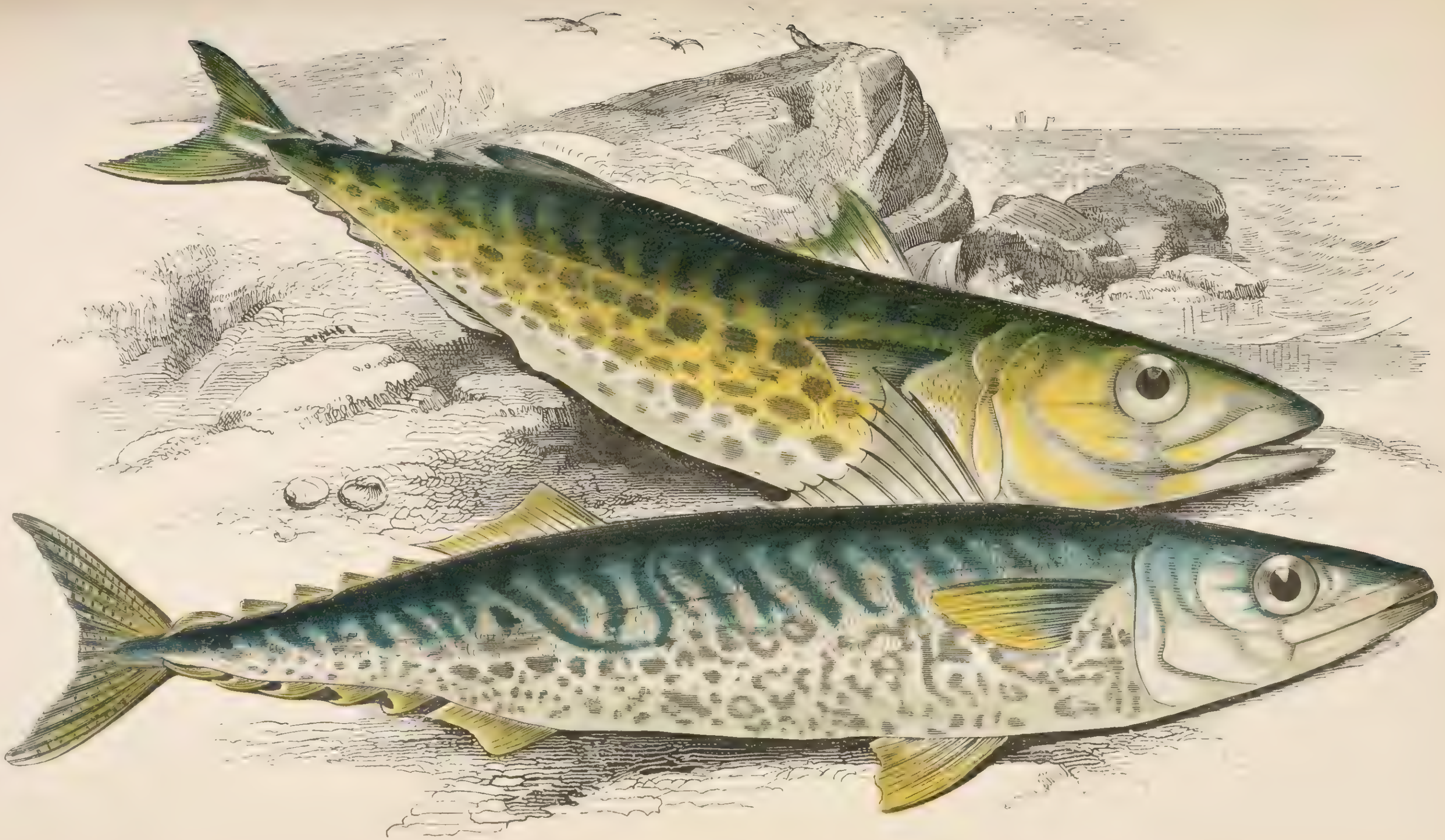
The Mackarel is so well known that it would scarcely require a description, but for the sake of comparing it with a few that are very nearly related to it. The general shape is round and plump, approaching to a rather compressed conical form on the fore part, and tapering gradually to the tail. Snout rather pointed; jaws equal, with teeth which also surround the palate. Eye lateral, moderately large; a soft membrane overlapping its hinder part. Gill membrane closely hid beneath the gill-cover. Scales of the body very small; lateral line irregularly straight. The first dorsal fin is opposite the ventral fins, which latter are slightly behind the root of the pectorals, a situation which caused Linnæus to class this fish in his Thoracic Order. A considerable separation between the first and second dorsal fins, the latter opposite the anal fin; and between this second dorsal above, and the anal below, and the tail, there are five separate finlets. The tail forked, with a small ridge at the root, above and below. Between the anal fin and vent a small separate spine. Pectoral fins pointed. The usual length is about sixteen inches; and the largest I have ever seen measured half an inch short of two feet. Colour of the back a varying blue, tinted with green; darker on the head; pearly white along the belly; the latter reflecting tints of purple and crimson when fresh from the sea; but these soon pass off after death. A series of irregularly-waved stripes of a much darker colour pass from the back downward and obliquely forward, ending above the lateral line; and usually from the pectoral fin to near the tail, there is an obscure row of dusky spots. Behind the eye a light yellow tinge.

The number of the fin rays are—the first dorsal twelve, firm, and received into a chink; second dorsal eleven; pectoral nineteen; ventral six, of which the first is spinous; anal, eleven: but these numbers are subject to some variation.

SPANISH MACKAREL.

Scomber colias,	Cuvier. Risso.
" *maculatus,*	Loudon; Magazine of Nat. Hist., vol. v, p. 22.
" "	Jenyns; Manual, p. 361.
" "	Yarrell; Br. Fishes, vol. i, p. 148.
" "	Gunther; Catalogue of Br. Museum, vol. ii, p. 361.

There appears much reason for believing that this species of Mackarel is the same with a fish described by Rondeletius, under the name of *Colias*, and of which as a principal character he remarks that its back is marked with lines, as in the Common Mackarel; but with the difference, that they are much less numerous, and do not descend so far towards the lateral line; and also that there are many dark spots, which he leaves uncertain whether they are on the back along or among the waved lines, or below on the belly. Willoughby describes the same fish, (p. 182;) but without appearing to copy he only translates the words of Rondeletius, with the understanding, however, that the spots are on the back in company with the lines; although in both these writers the figures are represented as without any spots. It is Risso who adds the mention of brown spots along the belly. This want of precision in the above-mentioned authors may leave it in doubt whether the fish mentioned by them be the same with that one called by Cornish fishermen the Spanish Mackarel, or another which we shall introduce to the reader as the Dotted Mackarel; but the mention of waved lines on the back causes us to lean to the former opinion, which is the same that has been adopted generally by naturalists. Rondeletius informs us he had seen it on the coast of France, but that it was more common in Spain; a circumstance which may account for the name by



SPANISH MACKAREL.

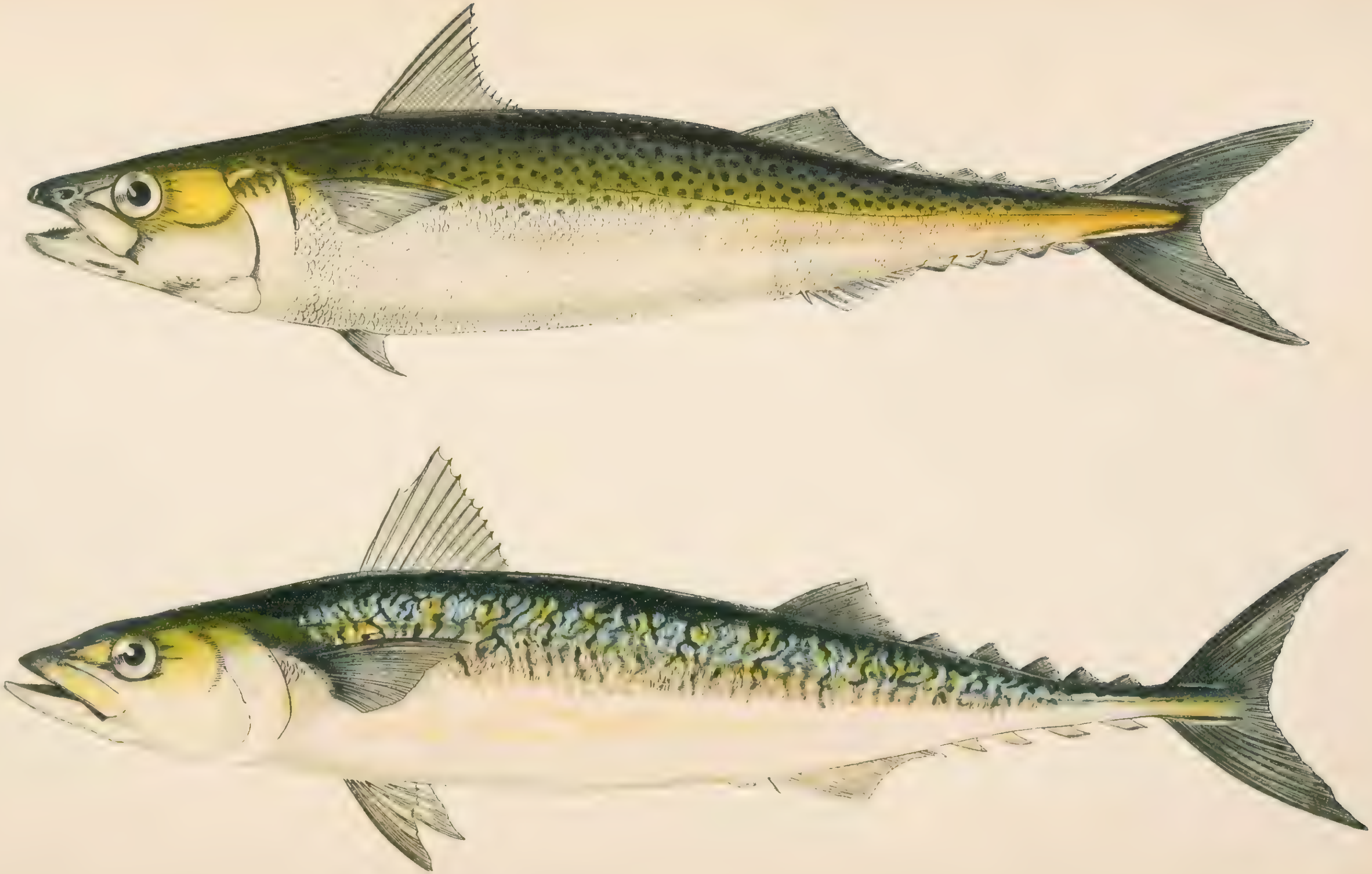
LXXX

which it is known to fishermen. In the memory of many persons this species has not unfrequently been caught in nets in Cornwall; where alone hitherto it has been found with us, and sometimes to the number of three or four hundred at a time, in the summer or autumn; but for several years it has become much more rare.

It appears to be widely spread in the ocean; for besides the Mediterranean it is also found on the coasts of America; but its specific habits are little known. I have formerly been told of its having taken the hook, but no certain instance of this has fallen within my own observation. For the table it is much below our Common Mackarel.

The example described measured in length fourteen inches and a half, the figure round and plump, in girth six inches and a half near the pectoral fins; the thickness of shape being carried backward to the tail more than in the Common Mackarel. The head bulky, eye large, an inch and an eighth from the snout; mouth large, jaws equal, teeth small, tongue moveable and pointed. From the snout to the pectoral fin three inches and a half. Rays of the gill membrane concealed; lateral line at first slightly descending, then straight. Some scales on the superior portion of the gill-cover; and on the body more visible than in the Common Mackarel. First dorsal fin in a chink, seven rays counted, the first shortest, second and third of equal length. In counting the finlets I numbered the second dorsal and anal among them as six in number, these first-named fins being low; tail forked, and at its origin doubly keeled; vent prominent. The colour a dark blue on the back, with waved stripes, but fewer and more obscure than in the Common Mackarel; a row of large dark spots from the pectoral fin to the tail; sides and belly thickly covered with smaller dusky spots. The tail, gill-covers and sides, and behind the eye, bright yellow.

Another example, from which our lower figure on the plate is taken, I find to differ in so many particulars, and those not of markings only, that I have been led to suppose it not improbable to be a different species; but I prefer leaving this for further observation, and proceed to point out its characters, without being able to give anything of its history beyond the fact that it was a male, with the milt not much enlarged on the 28th. of June; when it was taken in a net in company with many of the Common Mackarel. In its stomach a mass of pulp of the colour of lead, together with a considerable number of parasitic worms. It measured scarcely as long as the Common Mackarel caught at the same time, but was more round and plump; the length from the snout to the end of the middle of the tail twelve inches and a half; the body growing slender near the tail, but less abruptly than in the former example. Snout more produced than in the Common Mackarel, and pointed; jaws equal, with moderate teeth; head less heavy than in the former example of the Spanish Mackarel. Eye large; scales well marked on the back and sides, not visible on the belly; nor did I perceive any on the upper portion of the gill-covers. First dorsal fin in a chink; the rays much higher than in the Common Mackarel, and extending along the back more than equal to the space between its termination and the second dorsal; so narrow at its extremity that the two last rays are hid in the chink. Second dorsal and anal less angular than in the other specimen of the Spanish Mackarel, and their terminal rays lengthened out. Five rather long finlets above and below; tail forked with a keel above and below at its root; ventral fins broad. Lateral line passes onward to sink midway between the two dorsals. The general colour fine lively blue, with deeper stripes as numerous as in the Common Mackarel; sides and belly covered with dark spots, some of them ocelated; and gyrations, of various sizes, on a brilliant white ground; smaller and more numerous near the tail. No tint of yellow behind the eye as in the Common Mackarel. Pectoral, ventral, and the lower finlets, tinged with yellow; as the tail in a slight degree. The first dorsal fin has eleven rays. No air-bladder.



1. DOTTED MACKAREL. 2. SCRIBBLED MACKAREL.

LXXXI

DOTTED MACKAREL.

Scomber punctatus,	NATURAL HISTORY SOCIETY OF PENZANCE. Report for the year 1849, p. 353.
" "	"ZOOLOGIST" for 1849, No. 76.
" "	SIR JOHN RICHARDSON; Supplement to Yarrell's British Fishes, p. 12.

THE first published account of this fish is contained in the "Report of the Natural History Society of Penzance," as quoted above, and which was copied into the "Zoologist;" and as nothing relating to it has since come to my knowledge, I shall best serve the cause of science by extracting from that account its most material portion. Our figure is from the original drawing, as taken when the fish was fresh from its native element.

It was caught in a sean at Looe, in Cornwall, July 6th., 1848; and I owe the possession of it to the kindness of my late friend Mr. Clement Jackson, of that place. The length was fifteen inches and a half, and the general proportions were those of the Common Mackarel, but the jaws were more decidedly of equal length. The more minute differences will be pointed out at the conclusion of this description. The first thing which attracted attention, in comparison with a Common Mackarel which lay beside it, were the scales, which covered the surface of the sides and belly, where none at all appear in the common species. These scales were conspicuous, and appeared to be marked out by the crossing of minute lines running transversely, and their rounded edges appeared as if directed forward. There was no corslet, but above the pectoral fin there was some appearance of it in a line of denser scales, which vanished under the pectoral fin. The first and second dorsal fins were three inches apart, and the posterior edge of the former was more extended backward, and the groove that received it longer than in the other Mackarel. Lateral line remarkably and irregularly bent. First dorsal fin with twelve rays, the first longest; second dorsal with eleven rays, the terminal rays extended to overlap the first finlet; the space between the dorsal fins a little longer than the first dorsal; pectoral fin with twenty rays; a spine in front of the anal; five finlets above and below. Tail rather more slender than in the Common Mackarel, and in the attenuated portion of the body, close before the caudal fin, depressed and square.

But the most remarkable distinction between this and the other British species of Mackarel was in the colour, which was a uniform dark neutral tint over the head and back, without any bands or variegations,—it might be termed an olive bluish green, with green reflections at the sides; and from before the eyes, along the back and sides to the tail, the surface was thickly covered with spots of the size of a small pea, generally round and well defined, but a little larger, and elongated transversely on the summit of the back. The spots ended a little below the lateral line, and the belly was pure white; the surface between the carinations of the tail a bronzed yellow colour. A membranous process united the fifth ray of the first dorsal fin with the skin of the back; but this may not be a permanent character. I found this specimen a female, large with roe, and destitute of a swimming-bladder, as is also our Common Mackarel, and I believe also the *S. colias*, or Spanish Mackarel; and this observation becomes important when we keep in mind that Sir John Richardson has made the mistake of quoting my authority as if it had possessed that organ; and also that there is a species, not uncommon in the Mediterranean, which is only to be definitely distinguished from the Common Mackarel by being supplied with it.

Having obtained a figure, of the size of nature, with a description, I sent this fish with a copy of the drawing to Mr. Yarrell, in order to obtain his opinion with regard to its identity with any known species; and a portion of his reply is here given:—"On comparing the preserved skin of our fish with your representation I observe some points of distinction, which, though slight, may increase the amount of differences. Your fish appears to be less deep in proportion to its whole length than the old Mackarel, the measurement being two and three fourths deep, by fifteen seven sixteenths, or as one to five and a half; the one three and one fourth by fifteen and five eighths, or not quite one in five; and this is remarkable, as your example was a female and the roe large, as the time (July 6th.,) would of itself indicate. The mouth in your fish appears to be smaller, the angle of the gape not placed so far back, and the superior maxillary bone is shorter and broader. The posterior edge of the preoperculum is more rounded,—in our Mackarel the lower two thirds of this edge is almost a straight and perpendicular line; the anterior portion of the lateral line appears to be more strongly marked." To this may be added, that the adult Common Mackarel is distinguished from its younger condition by a dusky mottled line, which runs along the side and separates the lateral line from the belly. Nothing of this sort was found in this fish, though of full growth and large with spawn. In reply to my suggestion of a name, Mr. Yarrell said, "*Scomber punctatus* would be an excellent name for it, as referring at once to its most obvious external markings."

SCRIBBLED MACKAREL.

Scomber scriptus, NOBIS.

THIS species is not yet recognised in science, but I possess notes of three examples, which, in the course of years, have come into my possession; one of which was taken with a line, and the others in drift-nets, at a good distance from land. The fishermen explained to me that it was because their attention was excited by the distinguished beauty of these fishes, that they were set aside from the ordinary Mackarel taken with them, and brought to me for inspection.

The length of the specimen selected for description was thirteen inches and a half; round and plump, with the general proportions much as in the Common Mackarel; but there was a decided difference in some of the details,—as, that the head rises more especially in front of the eye, and again more abruptly from a well-defined line at the junction of the head and body, at which part the scales were more distinct, the rising slope continuing to the origin of the dorsal fin. Lateral line without those zigzags often seen in the Common Mackarel, and remarkable in the Dotted Mackarel. The body was also proportionally more slender as it approached the tail, and the fork of the caudal fin more slender and pointed. Pectoral fin more pointed. Carinations at the root of the tail further asunder, and in one instance noted as being absent. I possess a note of one example which possessed six finlets above and below: the specimen from which our figure is taken was only furnished with five. The first dorsal fin was lofty, the second ray the longest, its length an inch and six eighths; the distance between this fin and the second dorsal two inches and six eighths. A spine in front of the anal fin.

But the distinguishing peculiarity of this species is in its colour, which is generally a brilliant blue, deeper on the head and back; along the sides, below the lateral line, light pink, which separates the blue above from the white belly. The waved lines proceeding downward from the back were minutely scribbled or zigzagged, and more numerous than in the Common Mackarel, in the proportion of three to one; added to which there were alternate deeper and lighter bands of the general colour thrown over the whole. In one specimen these alternate bands were not perceptible, but along the top of the head to the snout there were strongly-marked reticulated lines on a light ground, all of which were separated from the cheeks by a well-defined, although somewhat irregular border of black or deep blue. The lines of colour on the back, which at their beginning did not exceed in thickness a piece of whipcord, in passing below the lateral line towards the belly became still smaller, and separated into two or three branches in a level with the pectoral fin. The ventral and anal fins and finlets below were of a pale pink colour. In one example the separated terminations of the zigzag lines on the side appeared like waving circles, or half circles, with spots. The first dorsal fin had eleven rays, pectoral twenty-one, and the ventral six. There was no air-bladder; and on the 15th. of May the roe far advanced.

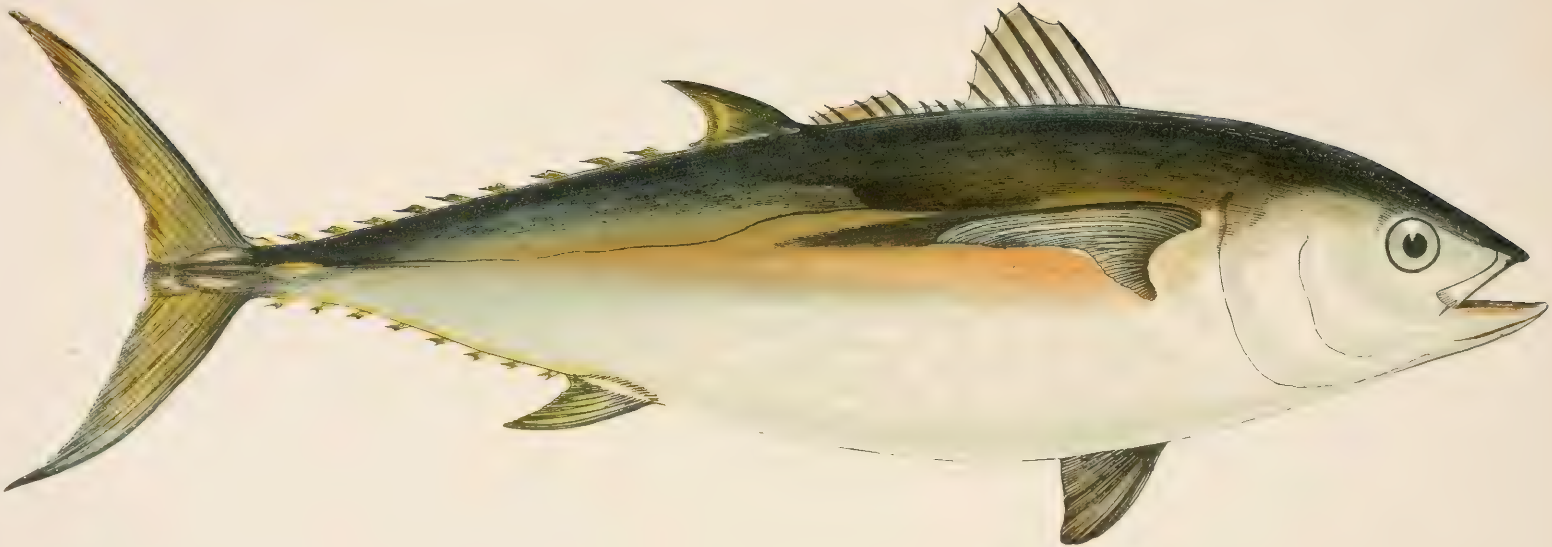
THYNNUS.

With much of the shape of the Mackarel, the body is more conical, forward and backward, from about the pectoral fins. It is covered with a coat of firm scales so closely united as to appear as if there were none; and those of the region of the chest are so distinct from the others as to appear like a corset; which, however, is not visible when fresh from the sea; and only appears when the surface has become dry. A prominent ridge on the side of the body near the tail. The first dorsal fin reaches back to the second. Finlets more than five.

TUNNY.

Tunny,	Jonston; Tab. 3. Willoughby; p. 176, but not his figure, which does not answer to his description.
Scomber thynnus,	Linnæus. Donovan; pl. 5.
" "	Fleming; Br. Animals, p. 218.
" "	Jenyns; Manual, p. 362.
Thynnus vulgaris,	Cuvier. Yarrell; Br. Fishes, vol. i, p. 151.
" *thynnus,*	Gunther; Cat. Br. Museum, vol. ii, p. 362. It is to be observed that Dr. Gunther supposes the figure given by Pennant of the Tunny, properly to represent another species, *Thynnus albacora,* but it is not certain that this figure was taken from a native example.
Scombre Thon,	Lacepede. Risso.

The name of the Tunny is supposed to have been derived from a word in the Greek language, signifying the wild rapidity with which it swims; and we might rest satisfied with this etymology if it were not that it has been thought probable to have been originally obtained from a Hebrew or Phœnician term, that was applied by the last-named people to this fish from the great size—much beyond that of others which were known in the sea of that country—to which it has been known



TUNNY.

LXXXI.

sometimes to attain. It is certain that the name of Thon or Than—in the plural Thannin—was in early ages applied to any of the larger inhabitants of the sea, and even of the river,—as the crocodile; and that its special application to the proper Whales is comparatively modern, and was only adopted because of the greatly superior size of these animals, as in still later times was also the Greek name of the Ketè, and the corresponding Latin word Cetè, both of which have been familiarly used to signify a large fish of any kind. The Tunny has been spoken of in these last terms as being the largest of any for which observers felt a particular interest; and instances are on record of its having been seen of such a size as fully to equal any of the true Whales which ordinary observation can have met with in the Mediterranean. Cetti, in his "Natural History of Siberia," is quoted as saying that a Tunny weighing a thousand pounds is not uncommon, and one has been known of the weight of eighteen hundred pounds. Pliny speaks as if he had been a witness to its weighing fifteen talents, or about twelve hundred pounds; and he quotes Aristotle for the fact that the breadth of its tail has measured five cubits and a palm, or between seven and eight feet, which large dimensions will appear the less surprising by reference to the authority of Belon, who says that in the year 1665, a Tunny was caught on the coast of Spain, which in length measured thirty-two feet, and in girth sixteen.

The fishery for the Tunny appears to have been followed in the Mediterranean from the earliest ages; and it is even more than merely probable that the people along the coasts of the nations which settled first on the sea border of Palestine, began their acquaintance with the ocean by the pursuit of which we speak. If we may give credit to the authority of Sanchoneatho, the art of fishing was practised by one who is believed to answer to the Tubal Cain of the Scriptures, and who for that purpose invented fish-hooks and the use of little boats; and, according to the same authority, there were fishermen at Berytus when Chronus (or Noah) was yet alive. Nor let it startle us that before the flood of Noah there should have been a Mediterranean Sea, with cities on its borders. Pliny records a tradition of the existence of Joppa before the flood, (B. 5, C. 14;) and the great goddess of the Sidonians was

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represented with the head of a fish, as signifying their connexion with the sea and fishing; the name of the city also having been derived from the fishery there established. It is not difficult to suppose that when the importance of this fishery and the method of conducting it had extended to the Greeks, the name applied to the fish would also be received, and supplant any other, if such other had previously existed.

The large examples of this fish already mentioned may be supposed to have attained a greater age than usually falls to the lot of this species, since there is no reason to give credit to an ancient opinion which affirmed that the life of a Tunny did not amount to more than a couple of years. But these individuals, contrary to the habiis of their race, are found to be solitary, which may arise from the circumstance that they have survived the instinctive influences of their sex; but there are others, not nearly so large, which in their wanderings limit themselves to companies of three or four, and it is such chiefly that visit the British coasts, especially on the western borders of the Channel, in the summer and autumn, when their headlong eagerness often drives them into the floating nets, in which they become entangled, and where not unfrequently they are held by the roughness of their teeth alone. They even reach the borders of Scotland, and have been taken at Gothenburg, in Sweden, in pursuit of herrings and other fishes of similar size and habits; but I have not been informed of their taking a bait with us, although where they are more abundant the fishermen obtain success with even a clumsy imitation of living fish, of which the Sardine, Flying Fish, and Mackarel are the most successful.

It is believed that this fish is listless in the winter, and does not wander away from the district it happens to be in when that season overtakes it; but in spring it revives, and multitudes then gather together in the Atlantic, and press towards the coast of Spain, from which they pass through the Straits of Gibraltar in their journey towards the Black Sea, in which alone it was the ancient although erroneous belief that they chose to deposit their spawn. This proceeding forms a regular system of migration, and is conducted in well-ordered columns, in which the strongest and most rapid take the lead, while the rest are content to follow their leaders along the accustomed route, which for the most part is within a very moderate distance of the land, and consequently is much influenced by the bendings of the coast, thus affording to many districts an opportunity for engaging in an exciting and successful adventure. It could only be in diminished numbers that these successive squadrons could approach the narrow passage of the Hellespont, of their manner in urging their way through which some curious information is given to us by ancient writers. It was observed that as they rapidly swam upward it was their constant custom to range along the shores to the right, until they came to the narrowest part of the Straits which separate Europe from Asia, where stands a rock of remarkable whiteness, at the prospect of which they become greatly terrified, and rush to the opposite side, in which neighbourhood a prosperous fishery was in consequence carried on, and which, from the wealth it brought was termed the Golden Horn. This part of the coast is commemorated by the poet Ovid in his melancholy voyage to the place of his banishment; and from him we learn that it was called by the Romans Tunny Bay. When, on the other hand, the Tunnies are about to leave the Black Sea, they wait the opportunity of a north wind, and hasten along in the opposite course to that by which they went upward; a change which observers attempted to account for by supposing that these fishes possess moderate clearness of sight in one eye only, and that for the sake of safety the blind eye is directed to that side from which but little danger was apprehended. In their different stages of growth these fishes were known by different names, the very young being called Cordyla, and when somewhat older Palamis; but there is little doubt on the other hand that two or three separate species were thus confounded together, as well as at last under the general name of Tunny.

The Tunny fishery has always been a source of wealth to the countries that have been engaged to it; but we need not describe particularly the ways in which it is at present carried on by the fishermen of Italy, and which appear to differ in some considerable degree from those which were practised in very early times. After referring to Herodotus, therefore, who mentions the net set for the school of Tunnies, (B. 1.) as a well-known practice as early as the days of Pisistratus, about five hundred and fifty years before Christ,—

> "The net is set, and dexterously thrown;
> By the clear moonlight shall the Tunnies come;"

we will content ourselves with quoting the accounts left us by the ancient writers—Ælian and Oppian, the narrative by the former author being of greater interest to us from the fact, that there is reason for supposing that what he describes is the origin of a practice now used on a part of the coast of Cornwall for taking Pilchards. The antiquity and origin of the thing will further appear from some remarks which we owe to the kindness of an eminent scholar, who does not survive to accept the thanks we would have offered him for the information thus afforded. Ælian says (B. 15, C. 5.) that the people who lived in the cities of Portus were well aware of the times when these fishes came to their coasts; and they prepared for them with boats, nets, and the other materials that were necessary; and especially they reared up in some commanding situation a watch-tower for the use of a man whom we may well designate the huer, and who answers to him who for the same purpose is employed also on the coasts of Italy; but the towers spoken of by Strabo were built of stone, whereas the one described by Ælian was formed of stout beams of wood. Each boat had a crew of six young men, and carried a long net, which was floated by means of corks along the head line, and the bottom weighed down with leads. When the weather was favourable the huer descried the approaching school, and gave the alarm. The movements of the rowers were guided by the sounds he uttered, and so skilfully was the proceeding conducted, that it often happened that the whole of the school became their prize. It will sometimes happen, however, that this assembled army of fish will change their course, and pass off towards the deeper water; but this was soon detected by the ready observation of the huer, who directed his orders accordingly. A long hawser was fastened to one of the posts of the huer's watch-tower for the purpose of sustaining the shore end of the net; and several boats proceeded in chase, each one with a section of the net that was intended to enclose the school. The first net was shot across the course of the fish, and as each of the four or five boats came to the place their nets were joined to the former, so as to surround and enclose them as in a pond, within which these fishes now remained confounded and helpless, without attempting to move. It appears that in this condition it was not difficult to warp them by the help of ropes to the land. The remarks before referred to, as illustrative of the same subject, are given in the following letters:—

"I enclose, for your perusal, an account of the sean, which I find placed in a copy of Æschylus, among the notes on the Tunny fishery, "Æschyli Persæ," v. 430. The poet there describes the Greeks as knocking the Persians on the head with pieces of the battered ships, as they floundered about in the water, their ships being sunk or battered to pieces,—as they would so many Tunnies enclosed in a sean. In the notes on the word Tunnies, the editor takes occasion to mention the manner in which the fish were enclosed under the direction of a huer, (*Θυγγισκοπορ*,) who ascended a promontory for the purpose, exactly as our Pilchard huer does; and he quotes passages from Theocritus and from Aristophanes and other authors in illustration.—See Bloomfield's "Æschylus, —Persæ," notes, L. 430. He thinks that Æschylus was fond of the sport. I will venture a remark, and act the annotator. It appears to me that the Greeks were not acquainted with the tuck-net: they dragged the net to the shore, and then knocked the Thunnies on the head, which were splashing about and endeavouring to escape. This would appear from the passage above quoted. The *Αμφιβληστρον* was a simple casting-net. The Scriptures partly prove my remark,—'Like unto a net (*Σαγηνη*—a sean,) which, when it was full, they drew to the shore.'—Mathew, xiii, 47." (I here beg to observe that the Scriptures more than partly prove the remark, for they make a clear distinction between two nets that were used on the Lake of Galilee by the Apostles. In chapter iv, verse 18, Peter and Andrew are described as *βαλλουζας αμφιβληστρον*—throwing a casting-net or amphibleestron into the sea, for they were skilful in the use of it, being professed fishermen; but in chapter xiii, 47, the action of the *Σαγηνη*, or sean, is differently described as *συναγαγουση εκπανξος γενους*

—collecting all sorts together. Herodotus adds his testimony to the distinction, as also to the antiquity of the casting-net, which demanded considerable skill to use it successfully. His description, in the "Shield of Hercules," is highly expressive:—

"Two fish of silver scale,
Panting above the wave, the fishes mute
Gorged, that beneath them shook their quivering fins
In brass; but on the crag a fisher sate
Observant; in his grasp he held a net.
Like one that poising rises to the throw.")

"The sean was a drag-net: so the writer, whose letter I enclose, understands it; very large, enclosing the fish by its sweep, and then drawn towards the shore. The passage quoted from Habakkuk, chapter i, 15, might be more literally rendered —'they drew them under their casting-net, and surrounded them (or gathered them by surrounding) in their seans.' I only mean this as a protest against regarding the *Αμφιβληστρον* as a tuck-net inside the sean. The expression in Habakkuk is in the Hebrew style an amplification of the same idea. The writer of the enclosed does not allude to the huer. If I had been bred at St. John's I should be tempted into that vile practice of punning, and say, 'He was not up to him,'—qui est in altum promontorium vel in malum litore infixum, unde Thynnorrum gregem specularetur, quo viso, signum piscatoribus dabat, qui retibus totum gregem includebant.—Notæ Bloomfieldii in Pers. This fixing a mast and climbing to the top of it must have been where the shore was low." (We observe that Ælian, whom the writer seems to have overlooked, describes this elevation as a stage fixed on a couple of lofty posts, with ledges to enable the huer to get up with ease.) "No need of this in Cornwall; but it shows what a useful person the huer was: they could not do without him. Dear sir,—I had quite forgotten that I possessed anything so much to your wishes as I trust the enclosed will prove, till I found it preserved in a volume of Æschylus—a refreshment to my memory.—C. V. Legrice.

Potter translated

————"onward rush
The Greeks, amid the ruins of the fleet,
As through a shoal of fish caught in a net,
Spreading destruction,"

loosely enough, omitting knocking them on the head with spars and fragments of wreck. It is curious enough that our fishermen do not employ the tuck-sean in the sean fishery for Mackarel,—a kindred fish to the Tunny,—and that too, although there are proofs of their losing a large proportion of what they enclose, from the absence of another net. It would be an improvement to shoot a second net outside the first, with its joining opposite the bend of the former. The inner net, thus first shot, would be used as a tuck-net.

The following is also from the same writer:—"In a very learned and curious work, 'Textrinum Antiquorum, or an Account of the Art of Weaving among the Ancients,' by Mr. James Yates, M.A., of which only two hundred and fifty copies have been printed, I find an historical notice of the sean. The two kinds of fishing-nets in common use among the Greeks were the *Αμφιβληστρον* and the *Σαγηνη*. The etymology of the former word clearly indicates the casting-net; but etymology affording no clue to the sort of net intended by the latter we must have recourse to the passages where it occurs for a clear view of its meaning. In Alciphron, Epist. i, 17, mention is made of persons who are fishing in a bay for Tunnies, and enclose nearly the whole bay with their *Σαγηνη*—sean, expecting to catch a great abundance. Lucian speaks of *σαγηνη θυννευζικη*—a Tunny sean. The Septuagint translation of a passage in Habakkuk, chapter i, 15, is *Ειγκευσεν αυτον εν αμφιβληστρο, και σιυηγαγεν αυτον εν ταις σαγηναις*, which, instead of our common version, more literally is—'He (the Chaldean) hath drawn him in a casting-net, and gathered him in the seans.' That the sean was used by the Greeks, as with us, to encompass a great extent of water, is shewn by the various uses of the word *σαγηνη* in a figurative sense, (of which several instances are given, as well by ordinary as sacred writers.) The Greek word having been adopted under the form sagena in the Latin vulgate, this was changed into segne by the Anglo-Saxons, and we, their descendants, have still further abridged it into sean. In the south of England this word is also pronounced and spelt seine, as it is in French. We find in Bede's "Ecclesiastical History" a curious passage on the introduction of this kind of net into England. He says, the people had as yet only learnt to catch eels with nets.

Wilfred caused them to collect together all their eel-nets, and to use them as a sean for catching fishes of all kinds. (This remark of Bede, however, can only be supposed to apply to the north of England; for as we have seen that the Phœnicians in the earliest ages were accustomed to use a sean, and it is known that they traded to the county of Cornwall before the days of Moses, it is a reasonable guess that this sort of net was introduced among our ancestors by that people.

But, says Pliny, when caught, the Tunny is cut into pieces, of which the neck, belly, and throat are the most esteemed; but they must be eaten only when quite fresh, and even then are apt to cause severe attacks of flatulence. The other parts, with the entire fish, are preserved in salt; and those pieces which resemble an oaken board receive a name from that circumstance, and are called melandrya. The parts about the tail are the least esteemed.

> "The fisherman shall here his spoil divide
> To different uses. *This* when slightly dried
> Is better meat; and *that* when moist is good,
> Whilst other parts are harden'd into food."
> MANILIUS, B. V.

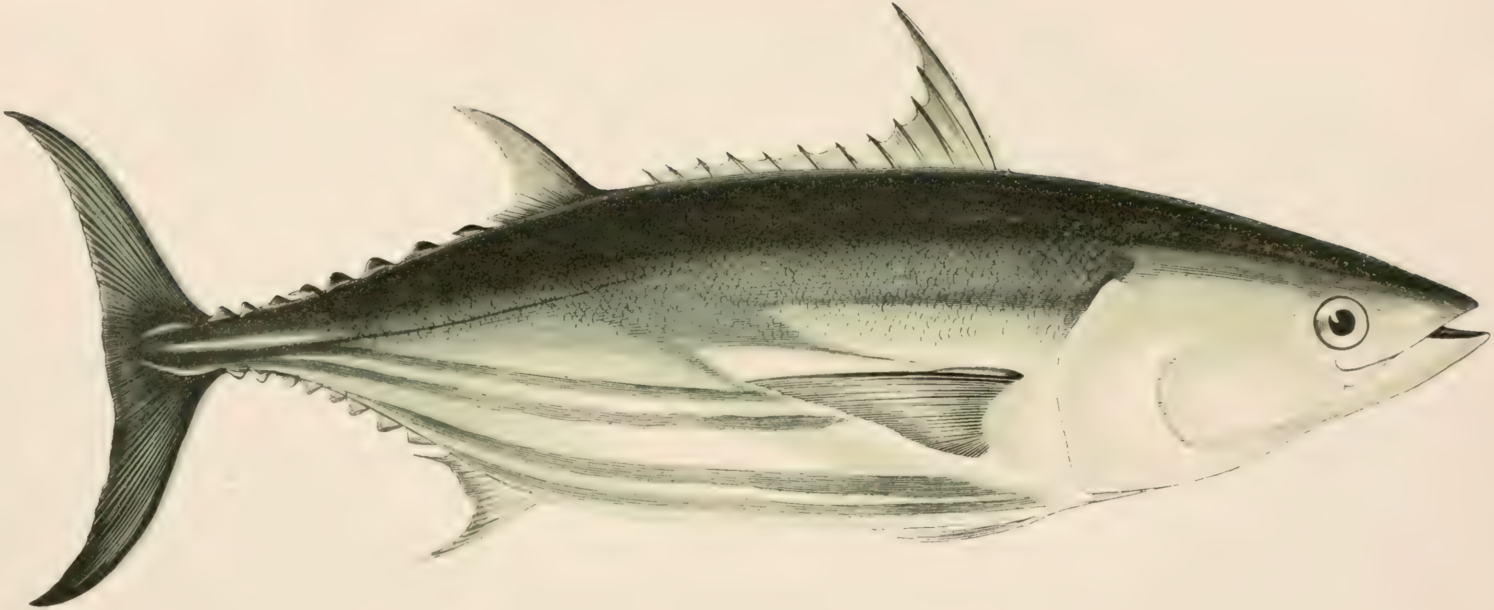
It appears from Aristotle that the Phœnicians, who lived at Gades, in Spain, on one occasion sailed westward from the Pillars of Hercules for four days, when at some shallow places full of sea-weed, they found a very large quantity of Tunnies of enormous size; which they caught and salted in jars, and afterward conveyed them to Carthage. These fishes thus prepared were not exported by the Carthaginians, but consumed in their own country.—(Notes and Queries.)

The example selected for description was one of four that were taken in the middle of September, entangled in a drift net shot for Pilchards. It measured four feet nine inches in length, and two feet five inches in girth before the pectoral fins; the shape conical from this part to the snout, which is pointed; jaws equal when closed, but when open the lower a little the longest; teeth numerous, in one row, small, and sunk in the jaw. Eyes large and bright; nostrils small, midway between the eyes and snout. Scales so closely set on the back as not to be distinguished, but, although lying close, perceptible on the sides and belly, appearing as if sunk in the surface: no corset appearing when recent from the water. Pectoral fin slender, in a depression of the surface, eleven inches long, but not reaching to the termination of the first dorsal fin; by which, among other marks, it is distinguished from the Germon or Long-finned Tunny. The corset line runs from the upper margin of the pectoral fin, and in a waved form passes up to the second dorsal; but before its rise the lateral line passes off to the tail; at its termination a strong elevated ridge, with a slight converging ridge above and below at the origin of the tail.

The first dorsal fin begins nearly above the origin of the pectorals, with, in different specimens, thirteen and fourteen firm rays; the first rays elevated, but becoming shorter as they extend close to the second dorsal, and all of them received into a chink. Second dorsal and anal not opposite, both hook-shaped, their substance too stout to allow of counting their rays. Pectorals with thirty-two rays. Ventral fins strong, sunk into a depression, with six flat rays. The number of false fins differs in different examples; varying from ten to nine above, and from nine to eight below. The tail greatly incurved, and slender towards the extremities; but the circle at the middle is interrupted by a double projection, forming it into two fins, with thirty rays. The tongue has a raised border or ridge on each side, its colour black. Colour of the back, top of the head, and jaws black, with a tint of blue, lighter at the sides; the belly white. Finlets bright yellow.

The physiological condition of the family of the Mackarel is most highly developed in the Tunny, and is highly characteristic. Its vessels are so filled with red blood, as to give the flesh the appearance of beef; and in consequence of this abundance of red particles in the circulating fluid, the heat of its body was found by Dr. Davy to be considerably higher than that of the sea, and of any other fishes he had an opportunity of examining, and to maintain a vigorous circulation of this blood, of which the high degree of heat is a cause and consequence, we find the heart possessed of a well-marked and powerful organization. It is large, firm, and in shape an irregular solid triangle. Internally—there are cords which spring from that portion of the auricle, (the office of which is to receive the blood from the veins,) which is close to its union with the heart itself above and below; and they pass into the cavity of the heart to become united to its walls on the opposite side. This cavity has several lateral recesses which do not communicate with any vessel; but they appear to serve as an enlargement of the cavity, without allowing of the weakening of its muscular walls; which latter are very thick and full of blood. There are three valves with cords at the beginning of the aorta (or vessel which conveys the blood from the heart to other parts of the body.) The general cavity of the heart and all its smaller recesses are crossed and re-crossed with tendinous fibres, to render them additionally strong. Such a powerful circulation of the blood must render necessary a proportional supply of pure air to maintain its energy; and this again an organization by which the power of abstracting it by breathing from the surrounding water shall be rendered efficient; a measure which is accomplished by a high development of the nerves supplying the gills.

It is worthy of notice to observe how near sometimes the ancients have approached to an important discovery without having been able to make it. They could not fail to know that the breathing of air was necessary to the life of animals of the land; and they observed an action somewhat similar to breathing in fishes, but were not able to suppose that air could be obtained, or be necessary in the case of the latter. According to Ælian, therefore, (B. 9, C. 64,) it was the doctrine of Democritus, Aristotle, and his followers Theophrastus and Empedocles, that the function of the gills in fishes was to extract from the salt water of the sea a portion of fresh water, which they supposed to be mingled with it; and that such a separation of elements, and appropriation of fresh water, was essential to their life in the same manner as the obtaining of air is to creatures inhaling it.



BONITO

LXXXVI

BONITO.

Scomber Pelamis,	Linnæus.
Thynnus Pelamis,	Cuvier. Jenyns; Manual, p. 363.
“ “	Yarrell; Br. Fishes, vol. i, p. 157.
Scombre Bonite,	Lacepede. Risso.
“ “	Gunther; Catalogue Br. Museum, vol. ii, p. 364.

This species is one of those which was in ancient times confounded with the Tunny, and for which therefore, fisheries were established as for that fish. Different representations are made as regards its excellency as food, and Risso pronounces it good; but it is probable that it varies according to the season.

But pursued as it is by the arts of man, it is still more a pursuer after those fishes it is able to overcome; the greater portion of which are such as we suppose the most difficult to be overtaken; but its swiftness, which we judge from its structure to exceed even that of the Tunny, renders it fully equal to the task. The Bonito therefore excites a larger amount of interest from the accounts given us by sailors, who have observed its actions in the wide expanse of ocean near and within the tropics; where it is found in abundance, and is often seen to spring aloft in pursuit of the flying fish; which it has driven into the air as a last resource of safety. Something like this also not unfrequently occurs in summer on the western coasts of England; where this fish and some others of the same family are often seen in pursuit of the Saury or Skopster; the chase of which presents an amusing spectacle by its leaping into the air, in the vain hope of seizing those which in that element at least are more than a match for its utmost efforts. It is observed that in its spring from the water a blow is sometimes attempted with the tail, in the endeavour to bring down the flying prey; and that finding itself too heavy for flight, it drops to the water on its side.

The Bonito has been known to wander so far north as the coast of Scotland; and Dr. Scouler records an example that was taken in the Frith of Clyde, in the month of July. Steward, in his elements of Natural History, reports another which was caught in the Forth; and I owe the knowledge of the capture of still another in the north to the kindness of T. C. Heysham, of Carlisle: it was taken at Whitehaven, in Cumberland. It has also been taken in Ireland.

The example selected for description was twenty-nine inches in length, which is little less than the size to which it usually grows; and it measured twenty inches round close behind the pectoral fins; head conical, ending in a point at the snout; under jaw projecting, the gape not wide; teeth few and small; tongue flat and thin; nostrils obscure, not in a depression; eye elevated, round, two inches and a half from the snout. The body round to the vent, from thence tapering to the tail, near which it is depressed. Scales scarcely visible. Lateral line at first descending and waved, becoming straight opposite the anal fin, from thence ascending and terminating in an elevated ridge with another ridge above and below near the tail. Behind the pectoral fins the corset is formed of a bright triangular section of the surface, from which begin four dark lines, which extend along each side of the belly to the tail, and which form a characteristic mark of this fish. From the snout to the pectoral fin eight inches and three quarters; the fin itself lower on the side than in the Tunny; lodged in a depression, pointed, and barely reaching to the border of the corset. The first dorsal fin beginning four inches in height, but low in its progress; lodged in a chink; and the separation between it and the second dorsal proportionally rather wider than in the Tunny. The second dorsal and anal hook-shaped, and nearly opposite each other. Eight finlets above and below. The tail deeply divided, the lower half rather more extended than the upper; ventral fins in a depression. Colour a fine steel blue, darker on the back, sides dusky, white below, from the eyes to near the anal fin, with the exception of the lines before mentioned.

No air bladder; the muscle red, and greatly charged with blood. It was a female, full of roe in July.

Another example offered some differences that are worthy of notice.—The length was a foot and seven inches, and the girth a foot. The marking of the corset was not exactly as in the former, and there were only three lines on one side, the dark colour of the back being extended to include the uppermost line. The first dorsal fin was altogether concealed in the chink; the two first rays of equal length, and close together, fifteen in all; the first ray white. The tongue of a remarkable form, being in front flat and firm, turned up at the middle of the side, and raised into a triangle, which sloped away inward, as if intended to guide backward, as in a gutter, what passed over it; and too firm to be moveable.

ORCYNUS.

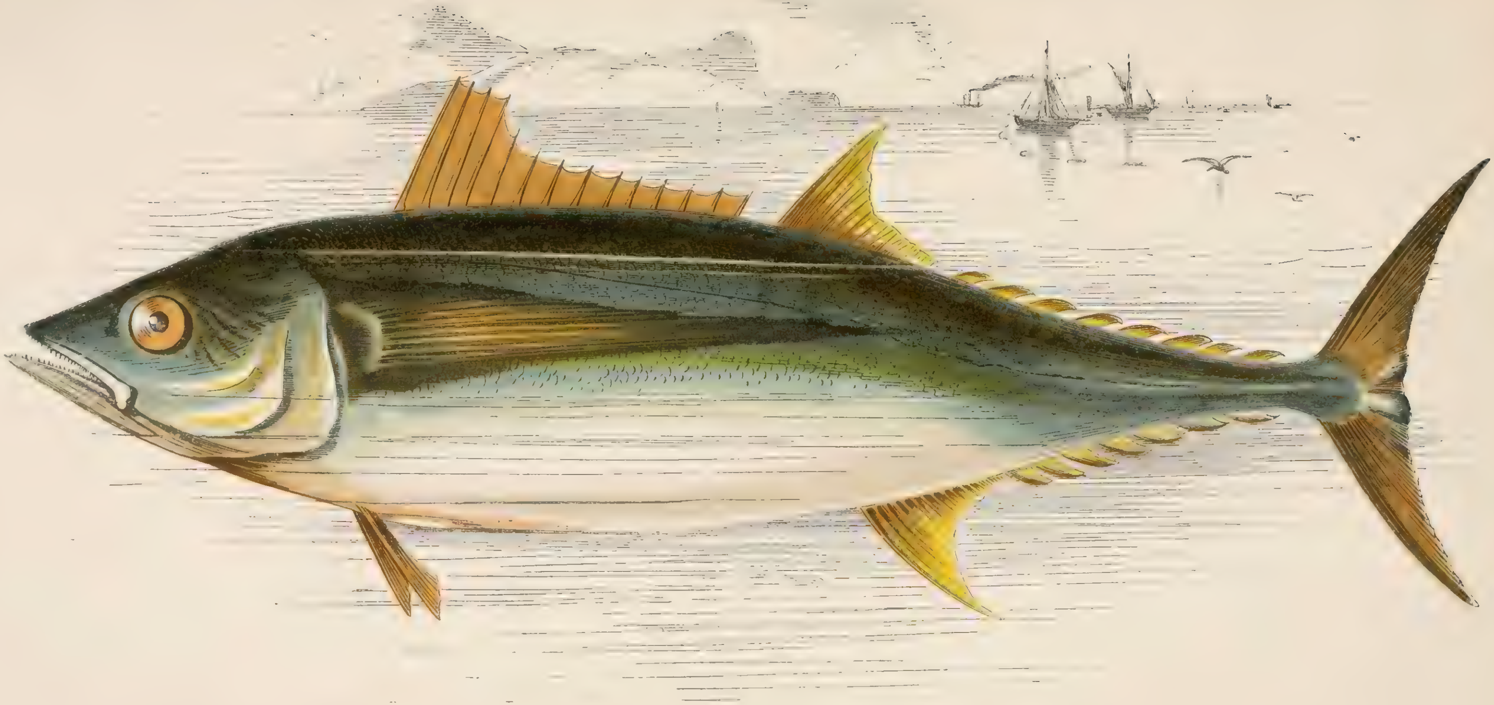
This genus, instituted by Cuvier, is only distinguished from Thynnus by the very extended length of the pectoral fins, which reach beyond the vent.

GERMON.

LONG-FINNED TUNNY.

Orcynus,	Jonston.
Scombre alatunga,	Lacepede.
Aile Longue,	Risso.
Orcynus alalonga,	Cuvier.
" "	Report of Natural History Society of Penzance for 1846.
" "	Yarrell; Br. Fishes.
" "	Richardson; Supplement.
" "	Gunther; Catalogue Br. Museum, vol. ii, p. 366.

The name of Germon has been applied to more than one species, but we confine it to that to which in our opinion it more properly belongs, and which is common and abundant on the south coasts of Europe; as well within the Straits of Gibraltar as without; where it has many of the habits of the Tunny, and is equally the object of valuable fisheries. There is no doubt indeed that a portion of the history of the Tunny, as it has been handed down from ancient writers, applies to this as to the Bonito and kindred species; so that long observation will be required before we can assign to each of them its separate portion. It appears however that the Germon passes through a less extensive range than the Tunny, at least



GERMON.

LXXIV.

towards the north; for while the last-named fish is often seen in our waters, and even visits the German Ocean, the Germon has only on two or three occasions been recorded as British. Twice it has been taken in the Mount's Bay, in Cornwall, of which an account is given in the Report of the Natural History Society of Penzance, as referred to above; and from one of these our figure and description are taken.

A third example was obtained at Portland in the middle of March, 1861, and came into the possession of William Thompson, Esq., of Weymouth; to whom I owe the information of its capture, and who presented it to the British Museum. Its length was thirty-three inches, and the extreme girth twenty-two inches and a quarter; extent of the pectoral fin eleven inches and a half. The specimen from which we obtain our figure and description was much less than this—the length being eighteen inches, and the depth where greatest five inches. The snout sharp, under jaw longest, gape small; teeth in a single row, small, sharp, and incurved. Eye large, placed over the angle of the mouth; diverging thread-like branching lines passing from it backward. Gill-covers in well-marked sections. A corset begins behind the gill-covers, and encircling the origin of the pectoral fin, forms for it a depression into which it falls. From thence this corset rises to the back, and extends to the second dorsal fin. Lateral line crooked posteriorly. The first dorsal fin rises behind the root of the pectoral, and extends to within a short distance of the second dorsal; the first four rays longest, fourteen in all, and spinous. Second dorsal hook-shaped, fifteen soft rays; anal also hooked-shaped, thirteen rays; this fin behind the second dorsal. Pectorals with thirty-seven rays, so long as to reach to the hinder border of the second dorsal. The two ventral fins close together, on a scale round which is a depression, and between them are four false rays; the first ray of this fin spinous, five others. Tail deeply concave. Finlets eight above and seven below. This example shewed extraordinary strength when caught with a line.

PELAMYS.

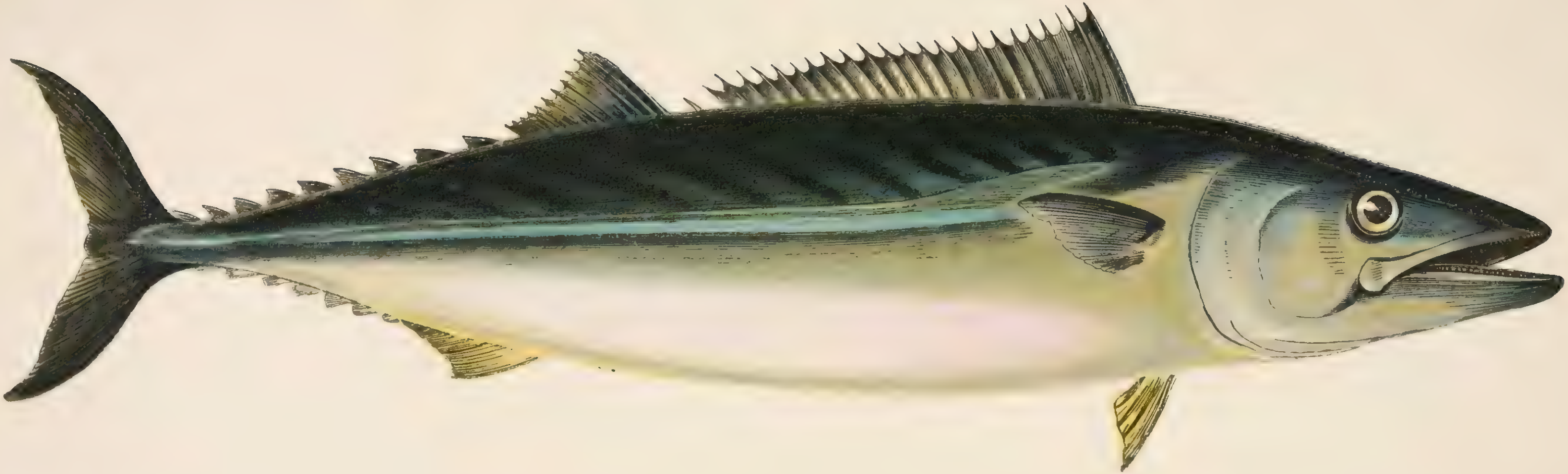
This genus was at first termed *Sarda* by Cuvier. The only distinguishing mark is, that the fishes included in it are furnished with pointed and very strong teeth, which are separate from one another.

PELAMID.

Pelamys sarda,	Willoughby; p. 179. Cuvier.
" "	Yarrell; Br. Fishes, vol. i, p. 159.
Scomber sarde,	Risso.
" *Pelamitus,*	Rafinesque.
" "	Richardson; Supplement, p. 18.
" "	Gunther; Catalogue Br. Museum, vol. ii, p. 367.

This fish is only of late known to naturalists as a separate species; but it is widely distributed over the ocean, from the Mediterranean through all its length and the Black Sea, to the coast of America and across the Atlantic to the Cape of Good Hope; although we do not find it numbered with the edible fishes of the last-named district by Dr. Pappe.

In rapidity of motion and eagerness in pursuit of living prey, it does not yield to any of this family, and it has been often seen to spring into the air after the Saury and Flying-fish; but its more characteristic habits are little known. In the month of September, 1836, in very fine weather, with the sea smooth, a large number of fishes, which were described to me by the fishermen so clearly that no doubt could be felt with regard to the species, were very near their boats in pursuit of Skopsters, (Sauries,) in chase of which many of them sprung above the water; when their bellies were seen to sparkle like silver, and the bands on their sides and blue backs were plainly visible. The same has happened on other occasions.



PELAMID

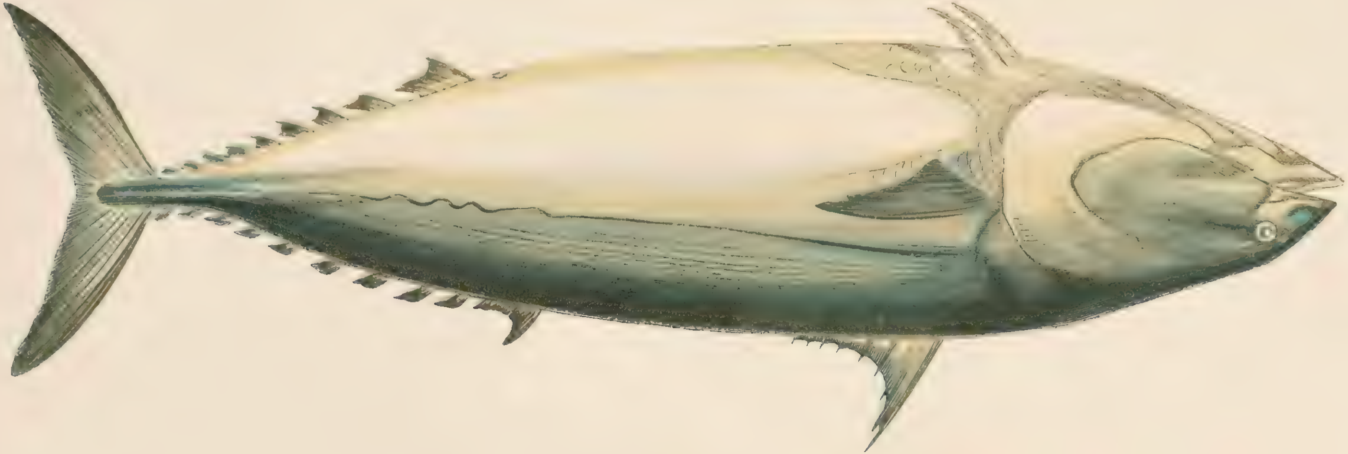
LXXXV

Rafinesque says it is caught in considerable numbers in Sicily in the spring by those who fish for the Tunny; and both himself and Risso speak favourably of its excellency as food. But common as it seems at times to be, it must be a wary fish as well as active; for whilst some others of its family not unfrequently become entangled in floating nets, it is very seldom that the Pelamid falls into this misfortune; and in two instances only has it been known to have been taken in Britain. One of these was so far north as Montrose; where it was recognised by William Beattie, Esq., and when preserved afforded a portrait to the second Supplement to Mr. Yarrell's History of British Fishes. Another example, from which our figure and description are taken, was caught at Swanage, in Dorsetshire, on the 4th. of December, 1860; for which I am indebted to the kindness of the Rev. J. M. Colson, who thus has placed it in my power to give a representation of a recent British example in its native colours.

The specimen described measured no more than fourteen inches, but it has been found to reach about a couple of feet in length; the shape in general resembling the Common Mackarel, but with a sharper and more lengthened snout; from which the outline rises to the first dorsal fin; the body round and plump to the second dorsal; from which it becomes much more slender as it approaches the tail; the base of which is round and strong. Under jaw longest, teeth numerous, large, loosely set, and recurved; two larger than the others on each side of the median line. Teeth at the root of the tongue in the middle, and two lines of them diverging posteriorly, one on each side of the palate; the gape large, extending back to the plane of the centre of the eye; the last-named organ small and bright, placed at about two thirds of the distance between the angle of the jaw and top of the head, and an inch and one eighth from the snout. The corset is formed of coarser scales than appear on any other part of the body; the lateral line forms a small arch at first, with the corset, and then passes straight back to the tail, ending in a prominent keel. The first dorsal fin rises just above the pectoral, and three inches and a half from the snout; extending back near to the second dorsal; the first rays longest, but afterwards they gradually decrease in elevation; number of rays twenty-two, the spines stout and strong; second dorsal membranous at the edge, fleshy at the base, with twelve rays. The anal fin begins opposite the termination of the second dorsal, with thirteen rays. Finlets nine above and seven below. Tail deeply curved, as in this family.

There are no oblique lines or cords above and below the root of the tail; the absence of which therefore might be added to the characters of this genus. Pectoral fin small, not very firm, rising close behind the gill-cover, and lying on the corset, which is about the same length; number of rays twenty-five; ventral fins small, with one firm and five soft rays. Colour of the head and back deep blue, with darker transverse lines passing forward from the back to the lateral line; lighter blue below the lateral line, and beneath this a deeper tint, fading into silvery white at the belly. Tail blackish; ventral and anal fins and the edge of the second dorsal inclined to yellow. It had an air-bladder, which was long and large.

We have already taken notice of the high degree of animal heat which belongs to some of the fishes of this family, and especially in the Tunny; and its probable connection with their activity and strength. But in the Pelamid this amount of heat was found by Dr. Davy to be even higher than in the others. In three examples which that gentleman examined at Constantinople, the warmth of the body exceeded that of water on the surface by seven degrees; and compared with water at a considerable depth, it was judged to exceed it by twelve degrees.



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AUXIS.

The characters of this genus are like those of *Scomber*, in having the first and second dorsal fins widely apart; but it makes an approach to the genus *Thynnus* in possessing a corset, and also a raised keel at the termination of the lateral line. It differs from the genus *Pelamys* in that the teeth are small.

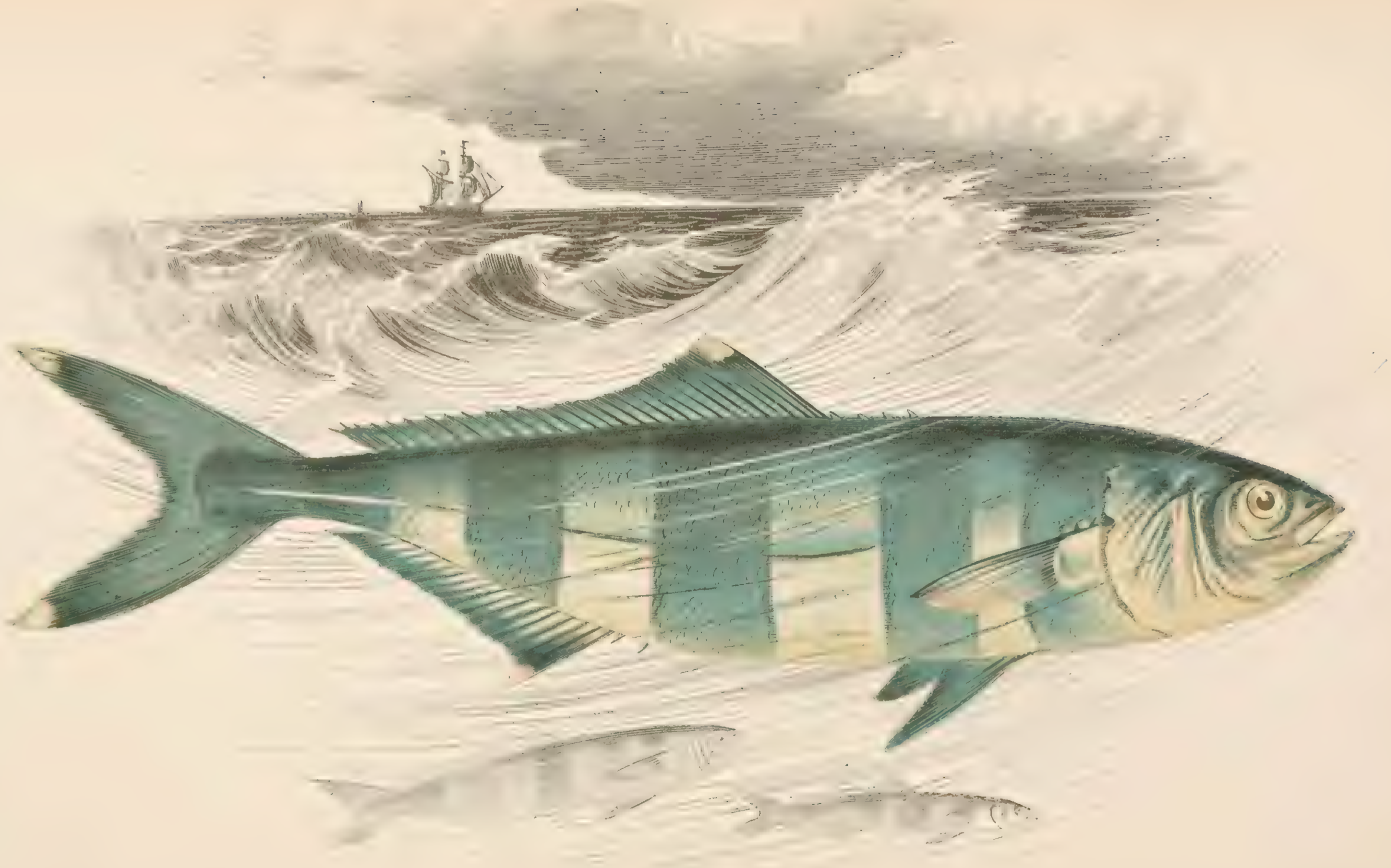
PLAIN BONITO.

Scomber de Laroche,	
" *Rochei,*	Risso.
" *bisus,*	Rafinesque. Gunther; Catalogue Br. Museum, vol. ii, p. 369.
Auxis vulgaris,	Cuvier. Yarrell; Br. Fishes, vol. i. p. 160.

This species, in common with the Pelamid, Germon, and others of the same family, some of which have not hitherto been known as British, was formerly confounded with the Tunny, although the mistake can scarcely be imputed to the fishermen; who, in the countries where it is familiarly known, have always given it a distinguishing name. In the Mediterranean, where it abounds, and is a regular object of the fishery, being caught from May to September, it is said by Risso to be known by the name of Bounicou. In southern climes its range is said to be extensive, being set down among the fishes of the West Indies on the one hand, and eastward among those of the Indian Ocean. It comes more rarely towards the north, although, as I am informed by the Rev. Walter Gordon, of Macduff, it has been met with in the Moray Firth. Mr. Yarrell mentions two examples which came to him at the same time, from some part of the south coast, and a specimen was caught at Looe, in Cornwall, in the year 1843. Two others have been taken in Mount's Bay, from one of which, caught in 1844, our figure and description are taken; the original specimen being preserved in the Museum of the Natural History Society at Penzance.

It measures eighteen inches in length, and in girth behind the first dorsal fin eleven inches and a half. Compared therefore with the Mackarel, the body is short and thick, the upper jaw short and sharp, gape narrow, under jaw longest, teeth small and fine. Eye of moderate size, an inch from the snout, the head elevated above it. Margin of the first gill-cover elliptic, gill opening large, an inch and a quarter from the gill-covers. Thickness of the body carried far back toward the tail; a corset; lateral line crooked, ending in a raised ridge. The first dorsal fin in a chink, five inches from the snout, having nine rays, of which the two first are closely united and longest, the hinder ones very low. Second dorsal and anal small, six inches from the first dorsal to the second. The finlets appear to vary, as I have a note in which there are eight above and seven below, and in another enumeration nine. The caudal fin is proportionally smaller than in the Mackarel, and the middle rays shorter, fifteen in all. Pectoral fins small, not reaching to the extent of the corset, stout, and received into a depression: as are the ventral fins, and as the depression into which they are received is single, they appear to lie beneath a scale. In the pectoral fin are twenty-one rays, the ventral six, second dorsal seven, and anal eight.

This fish is not entitled to the name of Plain Bonito, since the back, although generally of a dark blue colour, is also faintly marked with marbled lines and ocellated spots; as is also the figure given by Cuvier. These, however, had faded in the specimen when I examined it.



PILOT FISH

LXXXVII

NAUCRATES.

This is an aberrant genus from the family of true Mackarels. The general form is round, but less slender than in the last-named fishes; and the head more blunt. A keel on the side near the tail, as in the Tunny. Separate spines in front of the single dorsal fin, and also in front of the anal fin. The ventral fins are thoracic.

PILOT FISH.

Gasterosteus Ductor,	Linnæus.
Naucrates Ductor,	Cuvier. Willoughby; Appendix, pl. viii, f. 2.
" "	Jenyns; Manual, p. 365.
" "	Yarrell; Br. Fishes, vol. ii, p. 170.
" "	Gunther; Catalogue Br. Museum, vol. ii, p. 374.
Centronote Pilote,	Lacepede. Risso.

In remote times a usual method of classifying animals, and especially fishes, was by arranging together such as resembled each other in habits, or that were found to frequent similar situations; but from such a system it often happens that we are involved in confusion and doubt, when we endeavour to ascertain the species to which had been applied a particular and perhaps obscurely discriminating name, or manners which it shared with several others. This remark is especially applicable to the Pilot Fish, which at a remote date attracted notice under the name of Pompilus; but which became confounded with another fish, of a different shape, and that in modern classification stands under the generic name of *Centrolophus*, or Black Fish, and assumes to itself the specific denomination formerly applied to the Pilot Fish. There is still another species which bore a name of similar meaning, and of which a greater degree of uncertainty exists; to which we shall find further occasion to refer at the conclusion of our history of the present species.

Ælian informs us, b. ii, c. 12, that the *Pompilus*, or Pilot Fish, hated any approach to the land, and on that account was considered sacred to Neptune, the god of the ocean, which rendered it safe from any designed injury; and this in common belief was confirmed by the circumstance, that a man who had ventured to make a meal of it, soon afterwards had the misfortune to lose his son by drowning. But the origin of the name, and what caused these fishes to be mistaken for each other was, that both of them were supposed to be actuated by a friendly feeling towards sailors, as was shewn in their gambols at the sight of the "human face divine." They, therefore, gladly drew near a ship when they descried it on the open ocean, and kept close to it in all its voyages, so as not to be driven away even by any show of violence. It was only when the ship drew near the land that this fish was prepared to leave it; which propensity was of the utmost importance to the unskilful sailors of that day, who thus received the warning of their close approach to land, which otherwise they would not have discovered. Ovid refers to what was in his time perhaps the only fact that he heard or believed of this tradition:—

"And thou companion of the swift-winged ship,
Its constant friend o'er all the foaming deep."

And Pliny notices the same habit, but of which he knew so little as to confound the subject of it with the Tunny, and even the Nautilus; but it is in Oppian that we find the full particulars of the popular belief; b. i.—

"He the deep seas prefers to noisy straits,
Who for the distant ship impatient waits,
The friendly Pilot Fish, who gladly views
The well-rigged bark, and every sail pursues.
Round it the wanton shoals in order move,
And frisking, gaze on him who steers above:
Eager press on, nor will be left behind,
Though the full sails swell bloated with the wind.—
Thus they, while no approaching shores displease,
Swim with the ship tumultuous o'er the seas.
But when they conscious scent the coming shore,
Averse they court the sailor's look no more;
Avoid the nearer land, and hie again
With equal haste to the unbounded main.
Pilots observe the sign, and know the coast
Draws nigh when they perceive their comrades lost."

The supposed dislike of the Pilot Fish to a near approach to land is the only circumstance in this description that is doubtful; but if true in any degree, it is more probably to be ascribed to the greater dilution of the salt water at a harbour situated near the mouth of a river, of which it would be quickly sensible.

But that it will hold fellowship with a vessel for large distances is beyond doubt; and it is to this circumstance we owe it that the Pilot Fish has, not unfrequently, been a visitor to the British shores. The first mention of this was in the Linnean Transactions, vol. xiv.; where two examples are reported as having accompanied a ship from the Mediterranean into Falmouth. They have even done so the full distance from Alexandria, in Egypt, and some have remained to be taken in the quarantine pond of that port. One at least has been taken with a line; but such numbers have come under observation, that it becomes unnecessary to specify particular instances. It appears however that they do not often accompany a ship to the shallower or colder water of the British Channel; and only a single one has been found east of Plymouth. In 1818, we are informed that a Pilot Fish was caught in the harbour of Dartmouth.

It appears probable that when its friendly association with the ship is broken this fish hastens back to its more congenial climate; and in only one instance have I learnt that it has been found when alone, and at a considerable distance from any floating friend, or harbour. It seemed then to be bewildered, ran itself close to the shore, and without much effort to escape was taken with the hand. This was the largest example I have had an opportunity of examining, and has afforded the figure and description we shall give of this fish.

But remarkable as is this apparently friendly companionship between the Pilot Fish and his ship, there is another association which appears still more remarkable; but whether it be the same spoken of by ancient authors, will be regarded as uncertain. The most particular account we have of it is by Oppian, b. 5, who represents it as a property of a fish which he calls Hegetera, and which Ælian, b. ii, c. 13, calls Hegemenous, to accompany the more stupid whale as its guide, to point out the presence of danger, and lead it to safety and its food. Pliny also mentions this fish under the Latin name of *Musculus;* but the descriptions left us of its shape and size are insufficient and contradictory; and the figure given by Ruysch, in his "Theatrum omnium Animalium," pl. iv, f. 4, of the fish which he terms *Mysticetus Balenæ Dux*, acknowledged from Aldrovandus, is wholly imaginary. Modern observation therefore has failed in recognising this Guide or Pilot by any other character than that implied by its name; but it is only necessary for us to substitute the Shark in the place of the Whale to enable us to discover how fittingly the history answers to the fish we are speaking of.

It is the firm belief of sailors that such a fish is known to them; and that it ventures to be in close companionship with those ferocious inhabitants of the ocean without fear or danger, and even with signs of attachment; while the Sharks also seem conscious of a sympathetic feeling for their little friend. This widely-spread belief is remarkably corroborated by the narrative of the late Lieutenant-Colonel C. Hamilton Smith, who himself was well known as an eminent naturalist, as the Captain Richards he mentions was also a man of unquestionable truth, and a correct observer. It was in the Mediterranean that, on a fine day, a Blue Shark followed the ship, attracted perhaps by a corpse which had been commited to the waves. After some time a Shark-hook, baited with pork, was flung out. The Shark, attended by four Pilot Fishes, repeatedly approached the bait, and every time he did so one of the Pilot Fishes, preceding him, was distinctly seen from the taffrail of the ship, to run his snout against the side of the Shark's head, and turn it away. After some further play the fish swam off in the wake of the vessel, his dorsal fin being long distinctly visible above the water. When he had gone, however, a considerable distance, he suddenly turned round, darted after the vessel, and before the Pilot Fish could overtake him and interpose, snapped at the bait and was taken. In hoisting him up one of the Pilot Fishes was observed to cling to his side until he was half above water, when it fell off. All the Pilot Fishes then swam about awhile, as if in search of their friend, with every apparent mark of anxiety and distress, and afterwards darted suddenly down into the depths of the sea. The Colonel believed these observations on the Pilot Fish to be perfectly correct, as he had himself watched with intense curiosity an event in all respects precisely similar to the one now related.—(Griffith's Cuvier, p. 637.)

The Blue Shark is in the summer a common fish in the west of England, but in no instance has the Pilot Fish been seen to accompany it there.

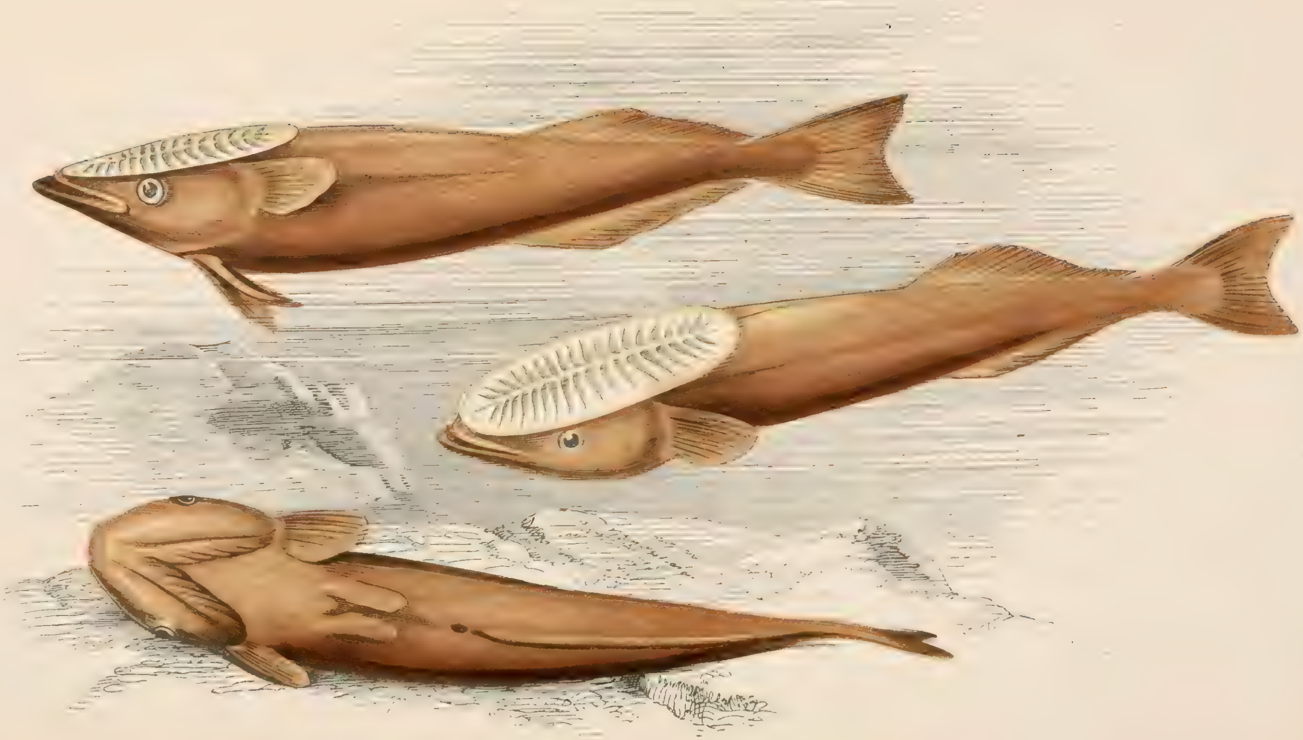
The example from which principally our description is drawn, was of more than the usual size; its length being fifteen inches and a quarter, and its girth eight inches, at the front of the dorsal fin. The general form is round and plump; scales on the body small, with marks resembling scales on the first gill-cover; the hinder gill-cover regularly but slightly striated. Forehead short and rounded; under jaw a little the longer; teeth numerous, slender, thickly set, with a vacancy at the symphysis. The eye prominent, and in one instance one eye differed from the other, both in size and colour. Lateral line but slightly bent, although in two other examples this line passed off high at first, and became bent down opposite the origin of the dorsal fin, ending in an elevated ridge close to the tail; a deep notch above and below the root of the caudal fin. Dorsal fin single, beginning at the middle of the body, more elevated at its origin, but lower in its progress; in front of it a ridge bearing spines, three in number, but probably a fourth hid in the skin; and in another example there were five spines, the first of them concealed. The anal fin begins opposite about the middle of the dorsal; and in front of it a single spine, but in a smaller specimen two spines. A small mark of a corset near the pectoral fin, which fin is pointed, round below; ventrals long and wide; tail forked. Colour blue, of different degrees of intensity in different examples—from brilliant sky blue with green tints, to very dark; white below, the body encircled with five deep blue bands. Caudal fin above and below tipped with white, as also the first rays of the dorsal and anal fins. The dorsal fin has twenty-nine rays, the anal eighteen, pectoral sixteen, ventral five, caudal twenty-one, besides fifteen false rays above and below.

ECHENËIS.

This genus is recognised by having a flat oblong disk on the top of the head, which is marked with a double row of transverse raised lines or ridges, each of which is furnished with spinous teeth, the whole enclosed within a raised border. There is in addition a single dorsal and anal fin, and the ventral fins are thoracic.

There are several species of this genus, but there is reason to suppose they have been represented as more numerons than they are, for it appears from the observations of Dr. Albert Günther, in the "Annals of Natural History," March 1860, that the number of plaits or laminæ in the disk or sucking apparatus on the head is subject to variation, and in consequence that a separation of species built on such variation will lead to error. It appears also that the exact form of the tail is uncertain as a distinction; for it is found to vary from the forked shape to the round in what may be termed the Common Remora, as the laminæ vary also in the same fish from sixteen to twenty. Roughness of the tongue has also been thought a specific character; but in the same undoubted species this has beeen seen to vary from a state of smoothness to decidedly rough.

All the fishes of this genus may be considered as being only furnished with a single dorsal fin; but an attempt has been made to represent the sucking apparatus as in its nature an anterior dorsal fin, although for special purposes it is made to assume a different form from ordinary fins. It is the opinion of Voigt that this modification is accomplished by the bending of the rays downwards on both sides, to constitute the disk with its laminæ and that the very small hooks which are on the borders of the laminæ have the same function as similar formations have in the several species of the family of *Belistes*. It is beyond doubt that there are examples in nature where an organ by even an apparently small change of structure is rendered capable of performing functions which appear very different from those for which it seemed originally intended; but more extended examination must be instituted before this can be considered certain in the present instance; and if there be at all a resemblance to a fin in this organ, it would rather appear to be in the raised border of the disk than in the laminæ, the structure of which appears to be of the nature of cartilage, and which rest on a series of bones that communicate with the spinous or upright processes of the vertebræ, and are themselves moved by independent muscular fibres. These laminæ are in pairs, proceeding from a middle longitudinal ridge, and in this respect differ greatly from the fins of any known fishes. When about to bring this sucking organ into action, the fish appears to bring the hooks or rough edge of these laminæ into contact with the surface on which it is its purpose to fix itself; and then, chiefly by means of the raised border of the disk,



REMORA.

LXXXVIII

to drive away the water, so that, by a process of exhaustion, it may adhere with the firmness it is known to be capable of exerting, which is so great that the strength of a man is scarcely sufficient to tear it away. Even in death itself the close attachment continues, although a sliding motion may without much difficulty loosen its hold. To the fish itself this removal is easy, and is accomplished chiefly by an action of the border, that permits a little water to pass among the attaching laminæ. From the drawing of a foreign species in my possession, I am led to conclude that when the sucking apparatus is not in action the sides of the disk are capable of being brought together for the purpose of covering and protecting the laminæ of the disk.

REMORA.

SUCKING FISH.

Remora,	Willoughby; Appendix, table ix.
Echeneïs remora,	Linnæus. Cuvier. Bloch; pl. 172.
“ “	Lacepede. Risso.
“ “	Jenyns; Manual, p. 473.
“ “	Yarrell; Br. Fishes, vol. ii, p. 377.
“ “	Gunther; Annals, etc. of Natural History for 1860, p. 6; and Catalogue of British Museum, vol. ii, p. 378.

It does not appear that when left to itself this fish is capable of long continued or very rapid motion; and yet it is found to be distributed over a wide extent of ocean, in regions where the climate is sufficiently accommodated to its nature; but it has not been met with northward of the temperate zone; beyond which the water appears to be cold for its sensations. It is said to be common in the Pacific Ocean, East and West Indies, and on both sides of the Atlantic, as well as in the Mediterranean; although, at least in the sea last mentioned, it is represented, as we have seen, to shun a near approach to the land; a habit which, according to Risso, has been accounted for by supposing that it is influenced by dislike to the diluted condition of the water, where a river pours its stream to mingle with the salter fluid of the deep. But whatever be the cause, there is reason to think there is truth in the supposition that in fact this fish does shun the close neighbourhood of land; and Rafinesque, who seems to have studied carefully the fishes of Sicily at Palermo, had not an opportunity of obtaining a specimen. Hasselquist, also, does not name it among the species he was able to find at Alexandria, in Egypt; although he mentions the *E. naucrates*, which is another of the same genus; and to which more especially some of the remarks of the ancient writers must more particularly apply. Ælian knew no other than the Remora, or Echenëis, that was of a dark colour, and in shape like an eel, (b. ii, c. 17,) which answers only to the species referred to by Hasselquist.

There is no doubt, however, that both these fishes were well known to the ancient Greeks and Romans, however they might confound them together, according to their practice in regard of species that displayed a likeness of habits, however they might vary in shape. But what the ancient authors have chiefly handed down to us about them, is for the most part limited to what were the popular notions of the wonderful occult and supposed magical powers with which their adhesive faculty was believed to be accompanied. We have already seen that the principal character of the Remora is the apparatus which is placed on the head; and modern observers have so far studied the actions of this fish, when endeavouring by its aid to lay hold of an object, as to instruct us with regard to the minuter actions of the fish in accomplishing its object.

It appears probable that under ordinary circumstances this fish is inert; and although for a short time, and on the spur of the moment, capable of active exertion, that it soon becomes fatigued and listless. It is not in search of food, therefore, as some have supposed—mistaking it for the Lamprey, or supposing these dissimilar fishes to have like habits—but for the sake of rest; and to be conveyed over a considerable depth of water, and for a long distance, with the smallest expenditure of effort on its own part, that it thus lays hold, with the instrument given to it by its Great Creator, of any one of the larger and more active fishes, with which it is able to come into contact. A Shark, Whale, or ship, which latter probably it mistakes for a Whale, affords the required accommodation; and in approaching them its motions are described as being with a sort of wriggle, with the necessary accompaniment, on the authority of the French naturalist, Commerson—an observer of high excellency—that its mode of swimming, even under ordinary circumstances, is with the back downward: a position which its general appearance in the relative distribution of colour and action of the smaller fins render probable, and which the act of adhesion in its final operation must necessarily require. In this action the pectoral fins are directed towards the back, and the ventrals are turned in the contrary direction; so that each of these pairs is engaged in performing what in other fishes is the office of the other; and the Remora glides along the surface of that to which it seeks to affix itself, until it has reached the place where it will be least exposed to injury from the violent actions of its bearer. A slight effort of the sucking laminæ displaces the fluid on the skin; and then by a movement in its nature much like that by which a boy contrives to cause his plaything of leather to adhere to a stone, by which to drag or lift it, the fish remains firmly fixed to the body that supports it; and from which a violent direct effort is scarcely sufficient to dislodge it, although a sliding movement in a forward direction may accomplish the removal with comparative ease. From a remark of Commerson, there seems reason to suppose that the adhesion is further secured by some specific action communicated to the skin of its bearer by the sucking organ, and by which its sensibility is greatly blunted. Lacepede quotes the manuscript of Commerson, as saying that on applying his finger to the organ of an active fish, he found it powerfully affected with numbness, so as to render it almost paralytic for a long time afterwards.

It was this remarkable habit of adhesion that excited so much wonder in ancient times; for the explanation of which, as it was far beyond the philosophy of the age, they were driven to the resource of an occult quality; which in that day was a common method of accounting for every obscure or otherwise unaccountable appearance of Nature. Nothing was too wonderful to lie beyond this ready method of explanation; and hence arose an ordinary article of popular belief, that by attaching itself to any moving object, and even to the largest ship, this fish was able in an instant to stop its course through the waves, and fix it in the midst of the sea immoveable as a rock.

After arguing on this subject, and holding up to scorn the doubts of unbelievers, Oppian represents his own and the ordinary creed; although it is clear that he knew so little of the fish as to confound it with the Common Lamprey.—

> "The Sucking Fish beneath with secret chains,
> Clung to the keel the swiftest ship detains.
> The seamen run confused, no labour spared,
> Let fly the sheets, and hoist the topmost yard,
> The master bids them give her all the sails,
> To court the winds and catch the coming gales.
> But though the canvass bellies with the blast,
> And boisterous winds bow down the cracking mast,
> The bark stands firmly rooted on the sea,
> And will unmoved nor winds nor waves obey.
> Still as when calms have flattened all the plain,
> And infant waves scarce wrinkle on the main,
> No ship in harbour moored so careless rides,
> When ruffling waters mark the flowing tides.—
> Such sudden force the floating captive binds,
> Though beat by waves, and urged by driving winds—
> Appalled the sailors stare through strange surprise,
> Believe they dream, and rub their waking eyes."

Pliny repeats in prose the same account, and individual instances are handed down by writers who certainly believed the occurrences they relate, as due to the cause to which they were ascribed; although a more intelligible explanation will suggest itself to the mind of a modern reader. It was love for Cleopatra that was more powerful than this fish in delaying Antony's ship at the battle of Actium, and the drunken idleness of the rowers offers a better explanation for the slow progress of the Emperor's galley, when Caius Caligula made his voyage from Astura to Antium.

There are but few instances in which this fish has been obtained in the British Sea; which is the more remarkable, as it is its frequent habit to attach itself to the Blue Shark, of which hundreds, and perhaps thousands, are caught on the western coasts of the kingdom every year. There is a specimen in the British Museum, which is reported to have been taken at Guernsey, but under what circumstance does not appear. Dr. Turton is reported to have himself taken an example from the back of a Codfish at Swansea; but Mr. Dillwyn, in his "Fauna of Swansea," says that he had strong grounds for believing that there was some mistake about it. There remains, however, an instance that is unquestioned; as reported by the late William Thompson, Esq., of Belfast, in his "Natural History of Ireland." It is contained in a letter from Dr. R. Ball, of Dublin, who says that on the 29th. of July, (1848,) Mr. N. A. Nicholson brought to him a fresh specimen of this fish, which he found adhering to the gills of a large Shark, which he had captured in Dublin Bay on the preceding night; where it was observed in shallow water, and driven on shore. A second Remora adhered to the gills at the opposite side, but when disturbed it made its way inwards by the branchial orifices, and was not seen again. Dr. Ball afterwards obtained the fish on which the Remora was found, and it proved to be a Blue Shark, of the length of ten feet and an inch; but the second Remora was not discovered.

The length of the specimen examined was four inches and a half; the figure stout on its anterior part; the head flat above, to afford space for the sucking disk; which reaches from the upper lip backward to almost the end of the pectoral fin—in form oval, and in this example with eighteen laminæ—proceeding from a middle longitudinal ridge. The eyes prominent; under jaw protruding; cheeks full. Body more compressed from the pectoral fins, tapering nearer the tail. Pectoral fins round, and high; ventral fins thoracic. A slight ridge from the disk to the dorsal fin; which fin and the anal are opposite; tail concave. Colour brown, but its distribution is remarkable, the under parts being dark, and the dorsal parts lighter, as well the back itself as the dorsal fin. We have already seen that the form of the tail and number of laminæ of the disk are liable to variation.

ZEUS.

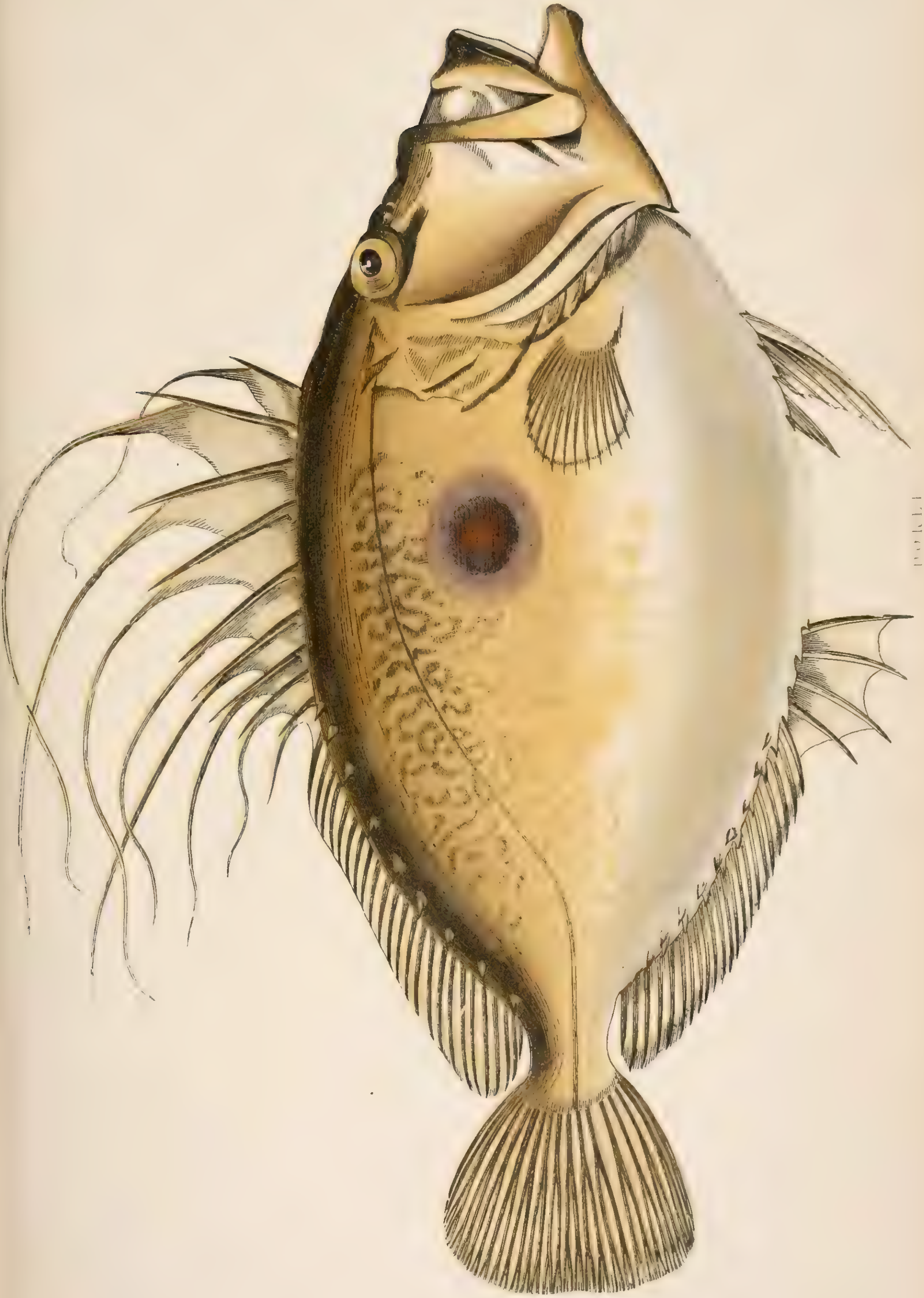
The body deep and much compressed; head sloping; upper lip formed by a membranous band. The general outline approaching to an oval. Gape wide,—jaws capable of great protrusion. Two dorsal fins, the first having spinous rays. Stout spines along the roots of the dorsal and anal fins, and along the belly. Ventral fins thoracic.

DOREE.

JOHN DOREE.

Doree,	Jonston; Tab. 17, f. 2.
Faber,	Willoughby; p. 294, Tab. S. 16.
Zeus faber,	Linnæus. Cuvier. Bloch; pl. 41.
" "	Donovan; pl. 8. This and Bloch's figure are not good.
" "	Fleming; Br. Animals, p. 218.
" "	Jenyns; Manual, p. 367.
" "	Yarrell; Br. Fishes, vol. i, p. 183.
" "	Gunther; Cat. Br. M., vol. ii, p. 393.
Zée forgeron,	Lacepede. Risso.

There rests some obscurity on the history and meaning of the ancient and scientific names of this fish, which in the Greek of Oppian appears to be Chalkeus, (*Χαλκευς,*) or the Copper Smith; and the Greek name of the more exalted of the gods of the heathen, which was selected by Artedi as the designation of the genus (*Ζευς,*) was applied to it by the Romans of the most ancient times, according to Columella, with the addition also of Faber, or the Workman. It would be vain to offer a guess on the cause of these high-sounding denominations, which probably had their origin, in times of high antiquity, from some such superstitious notion as supposed the Eel to be the embodiment of an evil spirit, and forbad the use of Surmullet as food, according to the doctrine of Pythagoras; but, taking an



opposite direction, it caused the Doree to be regarded as sacred to Neptune, the deity of the ocean. An explanation, which ascribes the names of Chalkeus and Faber to its sooty appearance, and the numerous tools signified by the angular spines with which the outline of its body is studded, was probably an after-thought. Its common English name appears to have been obtained from the French language, as signifying the yellow or gilded appearance which this fish not seldom displays when fresh from the ocean; but Janitorè (the Doorkeeper) and Adorèe (the Worshipped) have also been claimed as affording the proper etymology.

This fish is common in the Mediterranean, and along the south coasts of Europe, as also on the west and south of the British Islands; but it becomes more scarce as we proceed northward, and is accounted rare in Scotland and the north of England and Ireland. It is not the least uncommon portion of its history that it is met with also in the sea of Japan and Australia, although not known in the ocean between us and those distant regions.

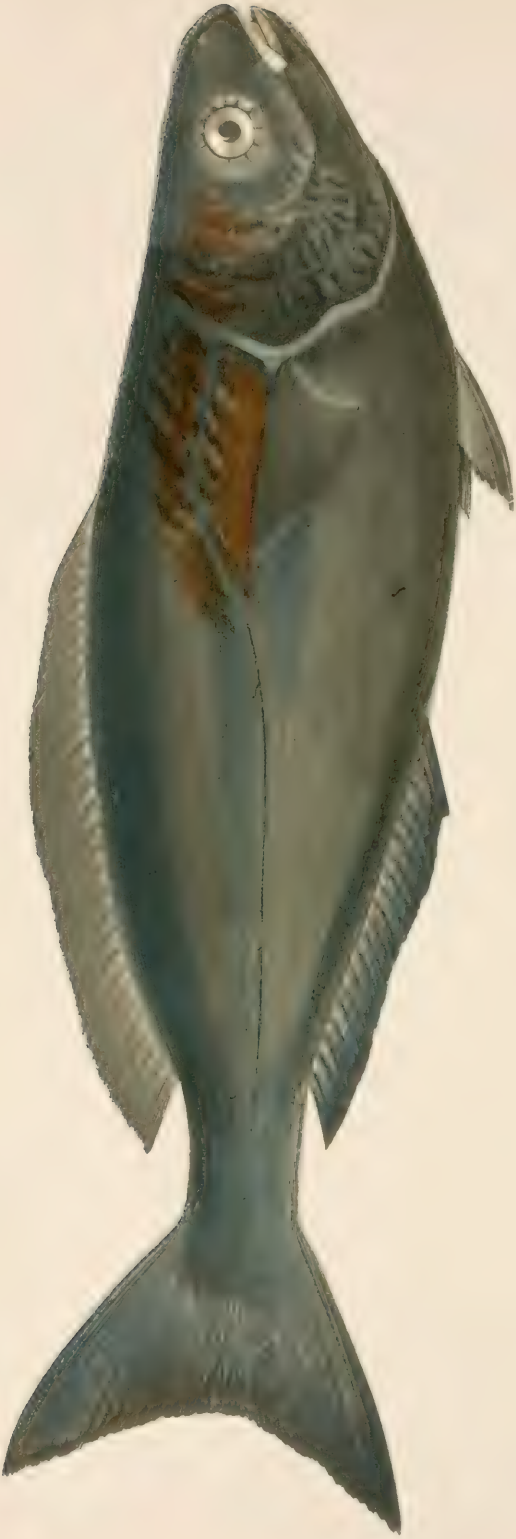
The motions of the Doree are in some degree influenced by the season, so that it is more frequently and abundantly caught in the summer and autumn; but its subordinate wanderings are guided by the prey it follows after, in the pursuit of which its appetite is eager and even ravenous. From the stomach of a Doree that measured twelve inches and a half in length, I have taken twenty-five Flounders, some of which were two inches and a half long, three half-grown Father-lashers, and five stones from the beach, one of which was an inch and a half in length; the latter having been swallowed, as we may suppose, in the eagerness of devouring the fish from the ground. So gorged was this fish with its gluttony, as to have become helpless and unable to escape being taken with the hand.

Although its ordinary motions are but slow, it also at times shews itself capable of securing a prey possessed of nimbly active powers; and this it effects by suddenly protruding its capacious jaws, and as quickly swallowing what it obtains. The Common Cuttle, *(Loligo vulgaris,)* of a few inches in length, has been found in the stomach of a Doree that measured only four inches. Pilchards also are a favourite morsel which it follows with perseverance, and thus it becomes often enclosed within the sean with them. From habits such as these we may judge that the Doree is ready to take the hook; but to ensure success the bait should either be alive, or made to imitate a living fish. A Chad, (the young condition of the Common Sea Bream,) hooked at the back, is too tempting a bait to be resisted.

The Doree is a fertile fish, and the young ones of small size are often met with, but they soon become scattered, and are not found in such abundance as might be looked for. It is not caught in very deep water, but its haunts are in what fishermen term rough ground, or in sandy bays where weeds abound, where it devours the smaller fishes which resort thither for the sake of the pasture. It often seems to float along rather than move, and the upright posture is preserved by the action of its ventral and pectoral fins, materially assisted also, as may be supposed, by the tendrils that overtop the spinous rays of the first dorsal fin, and which sometimes are of great length. On the authority of fishermen there appears to be also another use of these tendrils, not much unlike that of the fishing-line of the angler. The Doree is said to retire to rough ground, or to make for itself a depression in the sand, and when thus half hid these prolongations of the membrane overtopping the rays of the dorsal fin are allowed to float about like worms, to the temptation of passing fishes, which are thus enticed and put off their guard, when, by means of the powerful ventral fins, the Doree starts up and seizes its victim. But I have been informed also that at times it has taken the horizontal posture, and in that position has moved about with an effort to take its prey. The smaller fishes will scarcely shew alarm at the appearance of this seemingly sluggish enemy, until they find themselves engulphed in its ruthless throat.

This fish is well known to those who highly value the luxuries of the table, and usually fetches a comparatively considerable price. It was so in the ancient times of Rome, on which account Ovid applies to it the word *rarus*, in reference to its value rather than to its scarcity; and Columella names the Atlantic Doree among their most *generous* fishes. It was less known as such among ourselves until about the middle of the eighteenth century, but whether its coming into greater notice at that time arose from the preference shewn it by the well-known actor Quin, is uncertain. However this may be, I find in some MS. notes of that date, that a sudden advance in the price took place then, which is much complained of by a country gentleman. "The variety of sea fish," says he, "which our Devanciers had in great plenty and very cheap, is in our days become scarce and extravagantly dear, never cheap but when an accidental glut of Whitings and Macrell come in, which is casual and seldom; but for valuable fish, as Cod, John Dory's, they are seldom seen, and when they are, come extravagantly dear, and ye Cod never good or firm. Dorys yt used to be sold for 3 or 4 pence a piece, (Mr. Collins remembers them at 2½d. since his time,) are now two shillings or half-a-crown a good one." On the other hand it has been a misfortune to fishermen that considerable numbers have not maintained a corresponding value. On one occasion in the autumn more than sixty were hauled on shore in a ground-sean, and some of them of large size. Yet the whole were sold for nine shillings; and in another instance a hundred, the larger part of full growth, were taken together, with small profit.

The heaviest example I have obtained information of weighed eighteen pounds, and the longest measured twenty-two inches and a half. The whole figure much compressed, oval; older individuals proportionally longer than the younger. Head large, sloping from the eyes to the upper lip. Gape wide,—jaws capable of extensive motion and protrusion; teeth in both; upper lip formed of loose dense membrane folded across. Eyes moderately large, high on the head; nostrils close before them. A furrow from the upper lip to the first dorsal fin. Scales very small. Lateral line curved. Two dorsal fins, sometimes connected by a membrane, the first with strong spines tipped with soft processes, which are sometimes of great length. Second dorsal and second anal opposite each other; the first anal with four strong crooked spines. Pectoral fins small and round; ventrals large and long. Caudal fin round, and at its root the body becomes almost square. At the angle of the lower jaw a strong spine; each side of the body, along the roots of the dorsal and anal fins, and also along the belly a row of stout spines, which at the root of the second dorsal and anal fins are double. Two flat-pointed spines at the back of the head, and a broad spine at the upper part of the pectoral fin. Colour of the back pale brown, lighter on the belly; sides often of a golden yellow, and I have seen seven well-marked golden lines on this part, and on the middle a large dark spot, yellowish within, and with a light halo on its outer border. The whole is sometimes dusky, or with purple lines. When dying the colours fade greatly, but are restored when life has altogether departed.



CENTROLOPHUS.

The body moderately compressed, lengthened, covered with very small scales. Gape moderate. From the head, along the back, a ridge, on which stands the single dorsal fin. Eye lateral. Ventral fins thoracic.

POMPILUS.

BLACKFISH.

Blackfish,	Jonston; Table 3, f. 5.
Coryphæna pompilus,	Linnæus.
Centrolophus pompilus, and C. morio,	Cuvier.
Coryphæna pompile,	Lacepede. Risso.
" *morio,*	Jenyns; Manual, p. 370.
" "	Yarrell; Br. Fishes, vol. i, p. 179.
" "	Gunther; Cat. Br. Museum, vol. ii.
Holocentre noir,	Lacepede.

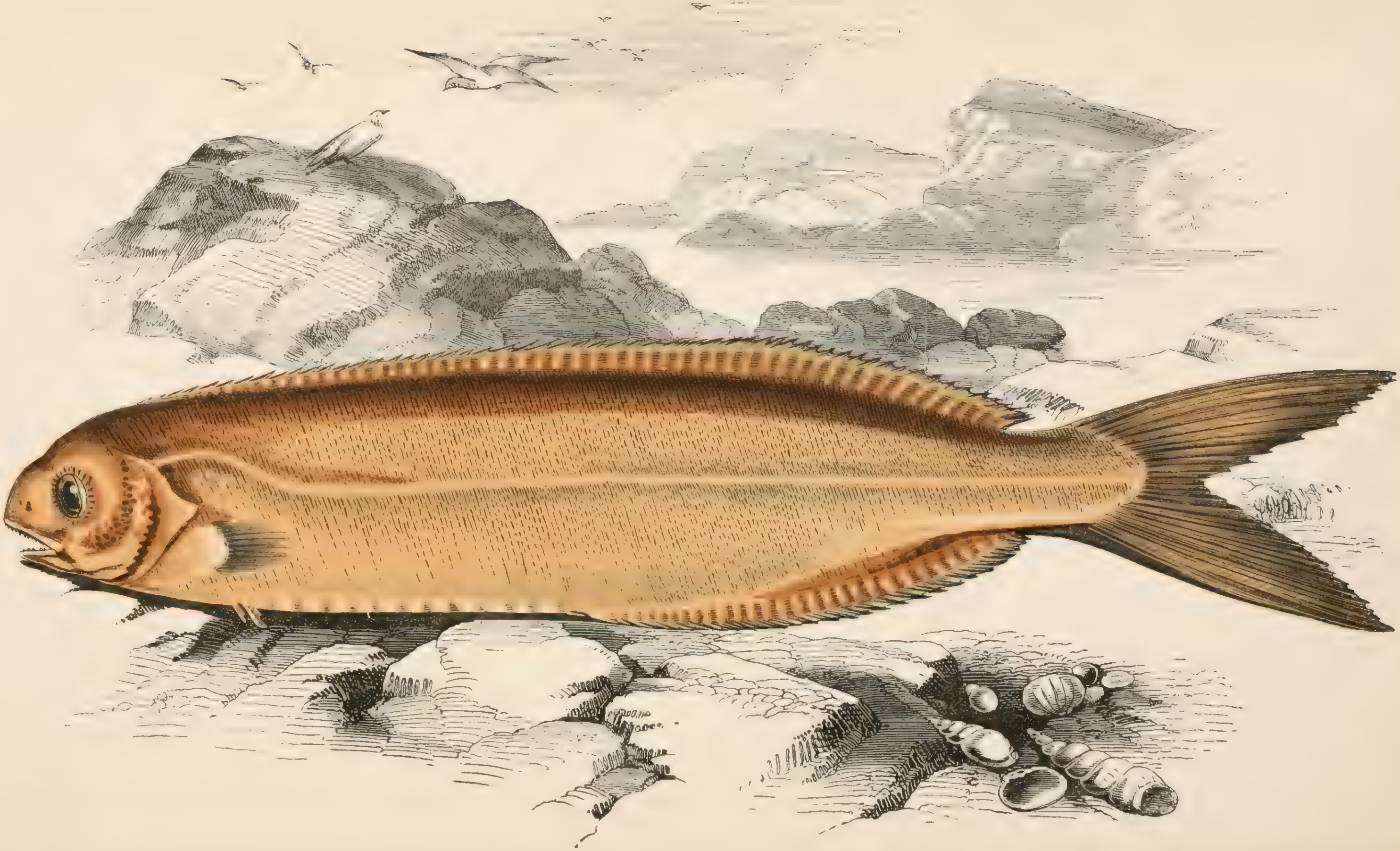
The Reverend George Jago was the resident minister of the Episcopal Chapel in East Looe, at the beginning of the eighteenth century, and, while residing there, he employed the favourable opportunities within his reach in making collections for a work on the natural history of the fishes of Cornwall, which, however, he did not live to accomplish. He had made known some of the fruits of his labour to the well-known naturalist, Petiver, by whom they were communicated to Dr. Derham, who inserted them as an appendix to the posthumous "Synopsis" of the illustrious Ray. When Jago died, his MSS. and drawings were left with his friend, Mr. Dyer, of East Looe, in whose house he had lived; and by the last-named gentleman they were handed over to Dr. Borlase, who at that time was engaged in writing his "Natural History of the County of Cornwall." The figure given by Borlase is small, but characteristic; but the colour described by Jago differs so widely from what is ascribed by other authors to the fish now known to be the same species, and the error committed by Borlase in regard to the proportions of its measurement, arising, as we judge, by copying the writing of Jago wrongly, is so great, that naturalists remained long at a loss to decide which was the true species. No doubt could be felt that the examples described were different from every other known as English fish, and therefore Pennant did not hesitate to include it in his work on British natural history, where he called it the Black Ruffe, a name which is changed into Black Perch in the last edition. Turton copies this (or is copied by it) when he names it *Perca nigra* in his translation of the "System of Nature" of Linnæus. Fleming ventures to guess that it resembles the Ruffe in form, and Stewart, in his "Introduction to the Study of Natural History," goes so far as to suppose it a variety of the last-named species; forgetting that it is not probable the Ruffe should be taken in the open sea, and that, even in fresh water, it has never been found in Cornwall.

It is probable, however, that the difference of colour was the chief cause of the mistakes committed by British authors in regard to this fish, and in which Lacepede was prevailed on to follow them; for it was not then so well known as it is now, that fishes which wander to our seas from warmer or brighter climates are liable to suffer this change in a remarkable degree. Linnæus, who, in regard to fishes, is usually led by the authority of former writers, defines the specific character of *Coryphæna pompilus* by the colours only; the back being painted with small bands above the arched lateral line, which, as a mark of distinction, would scarcely point out a species that, when found in our waters, was as black all over as if it had been dipped in ink. Nor would the little note he adds at the end be of great service in further identifying the species. The circumstance which had the effect of dispelling the obscurity which had so long rested on the history of this fish, may be termed an accident. I had been examining the figure given of it by Borlase, as compared with one by Gesner of the Pompilus of ancient writers, when an example was brought to me of a fish that was unknown to the fisherman who had caught it; and its resemblance to these figures in shape was so close that no doubt remained of their being the same species, a fact now admited by all naturalists.

But this fish was not unknown to ancient observers, although for want of discrimination they fell into that error concerning it which is common to them as concerns many species which possess the same or similar habits. They confounded it with the Pilot Fishes, and the remarks of Oppian are as applicable to one class of these fishes as they are to the other. The Pompilus seeks the society of a ship at sea, and will accompany it through a great extent of ocean, although not in equal numbers with the true Pilot Fish, already described. An individual of the species now under consideration came with a ship to the harbour of St. Ives, in Cornwall, and while there suffered itself to be caught with a gaff from a boat alongside. Jago's examples were taken together in a net in the year 1721, at the mouth of the River Looe; and so was another which came into the hands of my late friend Clement Jackson, a skilful naturalist of the same place. It was caught in a floating-net, set for Salmon; and such was the force exerted by this fish, that it carried the net before it over the head-rope, when it fell into the folds and became entangled. An example was taken in a drift-net shot by a boat near Falmouth, in August, 1850, and another was caught near Penzance, in February, 1857. The example before referred to as caught near Polperro, was taken with a hook baited with a slice (termed a lask) from the side of a Mackarel; but a mussel, without the shell, and a piece of the flesh of the Sea Bream, were found in the stomach, both these substances probably having been snatched from the hooks of fishermen. Jago found oreweed in the stomach of those he examined, and Ruysch says they feed on this, although chiefly on flesh. All the examples we have named were met with in Cornwall, but I have learnt from Joshua Alder, Esq., that this fish has wandered much farther towards the north. An example is reported by him as having been taken at Cullercoats.

The second specimen I have met with measured thirty-two inches in length, which probably is the greatest size to which it attains; but that from which our description was derived, was in length only fifteen inches, which was exactly the same with Jago's fish. The depth of the body behind the head was a little beyond three inches, and a little less than four inches at the beginning of the dorsal fin. This fin is situated on an elevated ridge, and begins at four inches and a half from the snout, ending opposite the termination of the anal fin, twelve inches from the forehead, which is blunt and rounded, flatter on the crown; mouth moderate, teeth in the jaws fine, tongue rather large; nostrils double, that one nearest the eye large and open. Eye prominent and bright. Membrane of the first gill-cover soft, but with a free edge that is a little cut in or serrated. Body compressed, with very small scales, which, when dry, appear curiously striated. Lateral line bent at its commencement. Vent six inches and a half from the point of the lower jaw. Rays of the dorsal fin fleshy at the base. Pectoral fins pointed; ventrals bound down by a membrane. Tail moderately forked. Colour all over black, the fins intensely so, scarcely lighter on the belly; a little bronzed at the origin of the lateral line. While employed in taking a figure, the side on which it lay changed to a fine blue. The larger specimen weighed nearly fourteen pounds; and the skin was found to be so tough as to be stripped from the body like that of an eel. No air-bladder was found. The taste was delicious.

The colours (as described by Risso) of a fish of the Mediterranean are, numerous dashes of blue, varied with slender bands of yellow; anal fin deep blue; pectorals yellow; dorsal fin with thirty-eight rays, pectoral fins with eighteen, ventrals six, anal twenty-four, caudal eighteen. It is said to come near Nice in spring and autumn.



COLNIE CENTROLOPHUS.

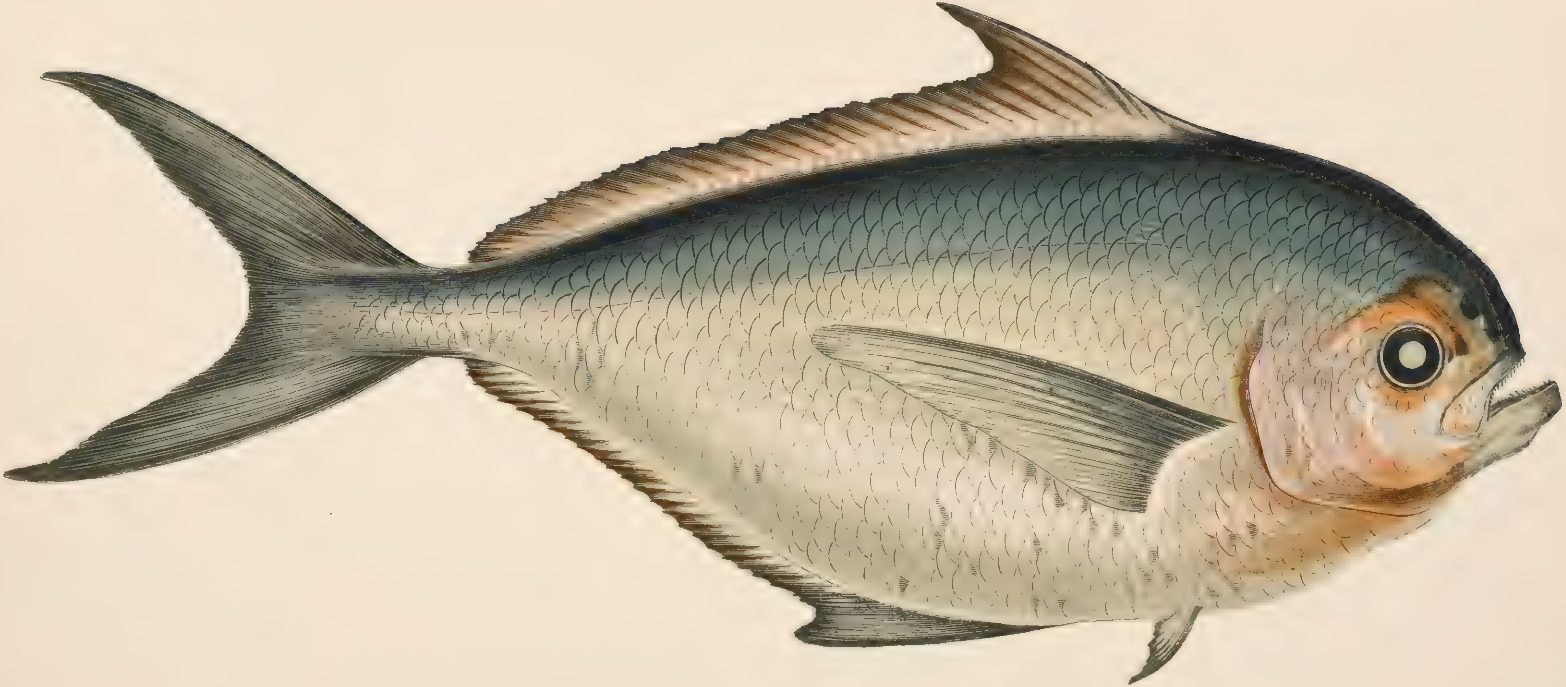
CORNISH CENTROLOPHUS.

Centrolophus Britannicus, GUNTHER; Cat. Br. Museum, vol. ii, p. 402, quoting Annals and Magazine of Natural History, 1860, p. 46.

In the middle of February, 1859, this fish was thrown on shore by stormy weather not far from Looe, and the specimen was immediately conveyed to me by the kindness of the late W. H. Box, Esq., of that town. After making a drawing, from which our figure is copied, and also a description, it was committed to the care of Mr. William Laughrin, A.L.S., of Polperro, for preservation; and when set up, it was sent to the British Museum, at the time when Dr. Gunther was engaged in forming the new and extensive catalogue of fishes contained in the national collection. I had easily ascertained that this fish was new to British natural history, but it remained for the discrimination of Dr. Gunther to discover that it differed from every species hitherto known to science. The natural habits of so uncommon a fish must of course be unknown; but from its rarity we may judge that it keeps far from land, and probably in the deeper regions of the ocean.

In length this fish measured one foot and seven inches; the general form compressed, thin at the back, with a more slender firm ridge also from the throat to the vent, at which it is five inches in depth. The vent at about the middle of the body, the opening compressed. The head to the hinder gill-cover is short; forehead rounded, both across and from above the mouth; and the back rising from the head to the origin of the dorsal fin. Eye large, perpendicularly oval, and with a singular aspect, as if looking towards the front; its centre an inch from the snout; several ducts round it on a diverging form. Nostrils double, close together, nearer the lip, large, and open. Under jaw a little the shortest; the gape moderate; teeth fine. The breadth of the body is carried evenly to within a short distance of the tail; lateral line arched for a small distance, and then passes straight to the tail. Scales not perceptible. Border of the foremost gill-cover free, with soft projections, as if serrated. The ridge along the back begins close behind the head, and the dorsal fin, which is embedded in it, begins at first obscurely anterior to the origin of the pectoral fin; the rays, which are firm, are so closed up by the skin of the dorsal ridge, as to be but little capable of motion. This skin becomes wider beyond the middle of the body, as does also the anal fin, which is equally embedded in a ridge, and both end almost opposite each other, at an inch from the tail. The pectoral fin was much mutilated from injury when cast on shore, as were also the ventral fins, which appear to have been small, and were a little behind the pectorals. The tail wide, and deeply divided. Colour nearly uniform brownish pink, lighter on the belly, darker along the top of the back, and still darker on the fins. The tail darker than the fins. As well as I could count them, the rays of the dorsal fin were forty-seven, in the pectoral seventeen, anal twenty-nine, and caudal twenty-five. In preserving it the stomach was found of large size, and contained green and red sea-weeds. Bones of the head and back soft as cartilage. The flesh resembled that of the Sunfish. There were not any teeth in the palate, as in the genus *Coryphæna.*

The small difference in the relative dimensions, as given above, from those of Dr. Gunther, is to be ascribed to the process of setting up; and Dr. Gunther further observes, that the rays of the fins are feeble, low, and the point where the spines pass into the rays cannot be distinguished. Both the dorsal and anal fins have scales. The rays of all the fins are shorter and much more slender than in the Pompilus; to which, we may add, that the general proportions of the body of these species differ considerably.



RAY'S BREAM

XCII

BRAMA.

The body compressed, deep; head blunt and round above the mouth; clefts of the jaws opening downward. Dorsal and anal fins single and long; tail, forked. Gill-covers entire. Ventral fins thoracic.

RAY'S BREAM.

Brama Raii,	Willoughby; Appendix, p. 17, Tab. v. 12.
" "	Ray; Synopsis, p. 116.
" "	Donovan; pl. 37.
" "	Fleming; Br. Animals, p. 201.
" "	Jenyns; Manual, p. 359.
" "	Yarrell; Br. Fishes, vol. i, p. 133.
Spare Castagnole,	Lacepede. Risso.
" "	Report of the Penzance Nat. Hist. Soc., for 1848, copied in Zoologist for 1849, xxvi.
" "	Gunther; Cat. Br. M., vol. ii, p. 408.

Cuvier expresses his opinion that it was Ray's Bream which Rafinesque had in view in describing his *Lepodus saragus,* and which in Sicily is called *Saragu imperiali.*

This fish was first made known to science by Ray, who obtained a figure and description from his friend, D. J. Johnson, of an example which had been left by the tide at the mouth of the Tees, in Yorkshire. This was in the month of September, 1681, and although since that time many specimens have come into the hands of naturalists, it is worthy of notice that a large proportion of them have only been met with dead on the shore after a storm, or ready to expire, as if they had been exposed to some uncongenial influence of weather or temperature after having wandered from a depth or district which was better fitted to their natural habits. One, however, that came into my possession, was taken with a hook by a Cornish fisherman; and a remark of Risso implies that it is also caught with some regularity in the Mediterranean in May, June, and December. The comparative rarity of its capture and the circumstances usually attending it, seem to imply that its more usual resort is in the deeper portions of the sea, where the temperature is colder, or at least more equable, than in shallower water; which circumstance may help to explain how it happens that it has been found within an extensive range of apparently opposite situations.

An example in the British Museum was brought from the Cape of Good Hope, and a large portion of the British specimens were obtained in the north of England, Ireland, and Scotland. Professor Nilsson also speaks of this fish as scarcely rare in the south and west of Sweden, although the instances are of sufficient interest to have secured the mention of the particular dates at which they were obtained, as well as the weather during which they were thrown on the coast, and which, in every instance was severely stormy. Five such occurrences are noticed by him to have taken place in different years between 1825 and 1850, and from the 1st. of November to the 15th. of December. An instance occurred, within my own knowledge, where a specimen was taken with the hand by a servant girl, who saw it in the water close to the beach, as it was about to die from no obvious cause; and of this example, before we conclude, we shall give a particular description, as it remains a question whether it was not in reality a distinct species from the better known *Brama Raii.*

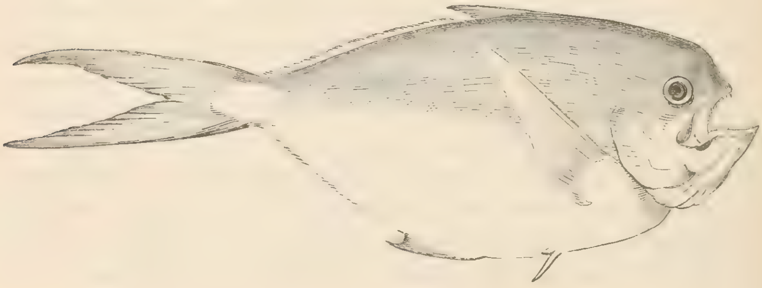
Of the more characteristic habits of this fish we know little, and Risso limits his information to the facts of the seasons of its appearance, and that it is valued as food; in which last particular he is supported by Rafinesque, if Cuvier's supposition shall prove correct, when he says that the *Lepodus saragus*, described by him, is the same as Ray's Bream.

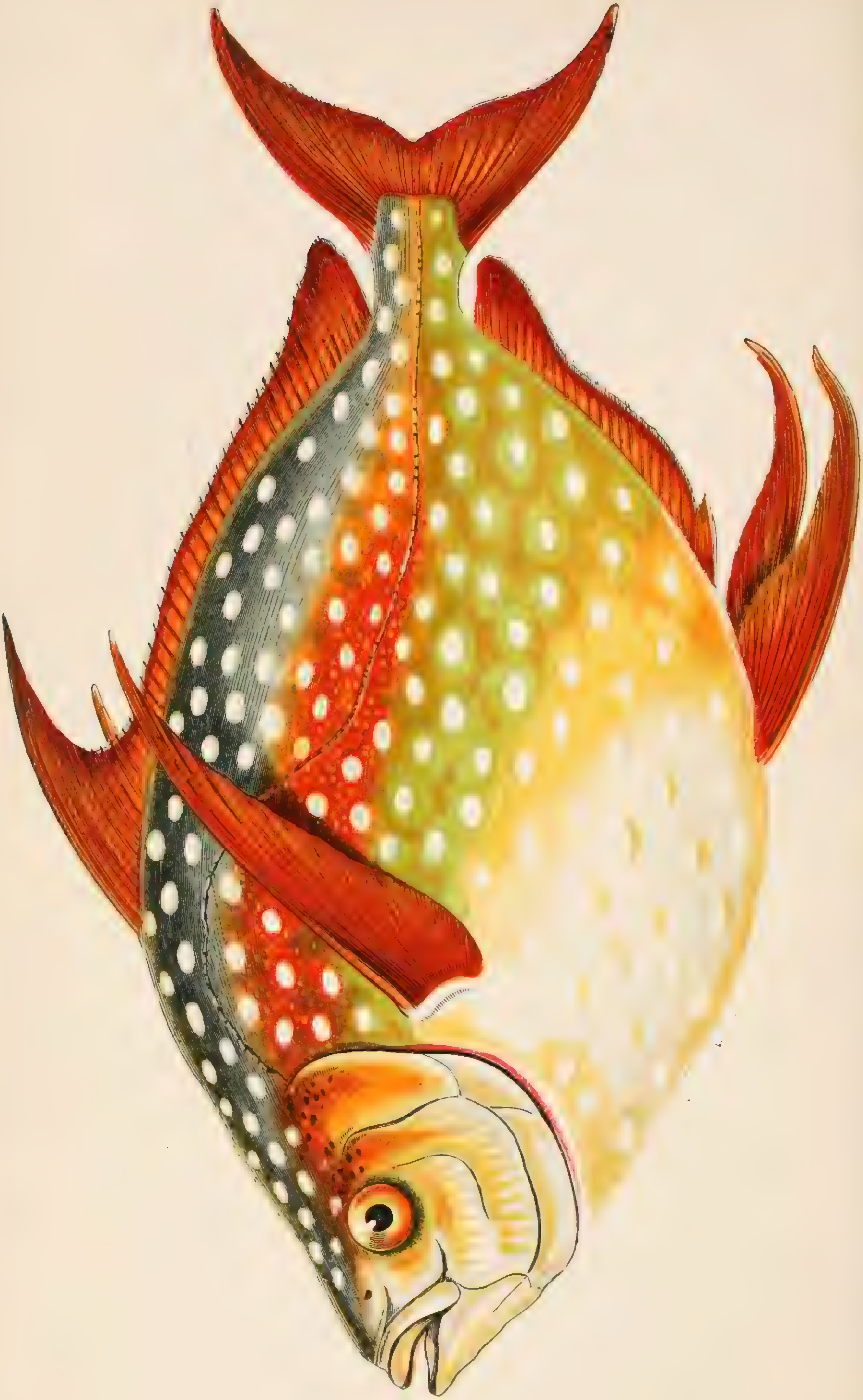
So deeply impressed on my mind was the opinion of the probability that two specimens which might have been supposed examples of the *Brama Raii*, were, in reality, of different species, that I ventured to communicate to a local Society of Natural History (of Penzance) a paper on the subject, with figures, and the opinion thus formed has received some support from the observations of two eminent naturalists of Sweden, whose evidence will be produced at some length. In my own paper, here referred to, the example of Ray's Bream is thus described:—The specimen measured twenty-three inches in length, which is three inches shorter than the one described by Ray; the depth eight inches and a half before the dorsal fin, where that naturalist's measurement was ten inches; the shape much compressed. Head small, sloping in front; the snout short; angle of the mouth depressed, under jaw longest; teeth slender, numerous, sharp, incurved, the inner row of the lower jaw longest; tongue fleshy. Eye large, round, not far from the angle of the mouth; the iris dark, pupil light. Nostrils single. Measuring along the curve, the dorsal fin begins seven inches and a half from the snout, having the shorter rays like blunt spines, each longer than the former; the fourth ray longest; the fin then becomes narrower, and continues slender to within an inch of the tail. Anal fin shaped like the dorsal. Pectoral six inches long, rather narrow, its direction obliquely upward. Ventrals triangular, with a wing three fourths of their length. Tail deeply forked. Lateral line nearer the back, obscure. The head, body, and fins, except the pectorals and ventrals, and even the mystache, covered with firmly-fixed scales, which are absent in a band across the forehead, the colour of which, and also of the back, is a very dark blue; copper-coloured brown over and before the eye; somewhat silvery on the sides and below. The dorsal and anal fins, and a stripe along the root of the former, are a sparkling silvery white, tinted with green before the dorsal fin; coppery and lake along the upper part of the sides. The rays of the dorsal fin number thirty-four, anal thirty, pectoral eighteen, ventral five, caudal twenty-four. The liveliness of the colours will be accounted for by remembering that this example was fresh from the water. In another example the tints were wanting.

From Nilsson's "Skandenavisk Fauna" I learn that, among examples of this genus taken in the Northern Ocean, not far from the coast of Norway, was a specimen which was believed to offer considerable differences from the others, of a character, in the opinion of the naturalist, Fries, to vindicate him in forming for it a separate genus, to which he appropriated the name of *Pterycombus (Brama.)* The example was mutilated and dry when it came into the hands of its describer; but the distinguishing characters, as noted by him, are,—a difference from the other species in the number of the rays of the fins, and in the arrangement of the scales which cover the dorsal fin. The vertical number of the rows of scales in the first-named fish was eighteen, and in the latter thirty-four. The dorsal and anal fins were without scales, and set in a deep furrow that was bordered on the sides with a row of large scales. The fin rays are said to be of the dorsal forty-six, anal forty, pectoral twenty, ventral six, and the tail twenty.

How much of the discrepancy between this description and that which I shall proceed to give of an example taken in Cornwall, (figured below,) can be ascribed to the confessedly mutilated condition of the northern fish, will only be a matter of opinion; but if finally it should be decided that they are only variations of one species, they form a new and remarkable portion of the history of this curious fish.

The specimen which came under my own inspection measured about seventeen inches in length, and, exclusive of the fins, was five inches and a half in depth; the snout blunt, sloping suddenly above the eyes; angle of the mouth depressed; teeth numerous, sharp, incurved, the four in front of the under jaw very long. Body thin, deep. Dorsal fins appearing as two, the first having flexible rays, the second long and narrow, and there was no reason to suppose that the appearance of two dorsal fins was owing to a rent or injury. Tail deeply divided; pectorals long; ventral fin with a wing, by which means each fin seemed double; anal fin fleshy and somewhat expanded at its origin, obscure in its progress. No visible lateral line. A broad band from eye to eye. Colour blue, deeper on the back. Covered with large scales, as well on the body as the fins, so that the dorsal and anal appeared like an extension of the body, and I found it impossible to count the rays.





LAMPRIS.

The body deep in proportion to the length; the side ringed as it approaches the tail. Snout short; gape narrow; teeth small or none. Dorsal and anal fins single, and much extended on the fore part; tail forked. Ten long rays in the ventral fins, which are placed far back on the belly.

OPAH.

Zeus luna,	Turton's Linnæus.
Chrysostose lune,	Lacepede.
Lampris guttatis,	Cuvier.
“ *luna,*	Fleming; Br. Animals, p. 219.
“ “	Donovan; pl. 97. Jenyns; Manual, p. 369.
“ “	Yarrell; Br. Fishes, vol. i, p. 194.
“ “	Gunther; Cat. Br. Museum, vol. ii.

This fish—of remarkable shape and gorgeous colours—remained unknown to the students of nature until comparatively modern times; but Nilsson informs us that it has been taken off the coast of Norway *time out of mind*, and in that country it bears the name of Laxetoye, or the Large Salmon, under which name it was described by Peder Claussen in the year 1632, the example which was the subject of his observations being of the weight of one hundred and forty pounds. It will serve as an apology for the popular mistake in referring this fish to a family which differs from it so considerably, to mention that Dr. Parnell, as referred to by Mr. Yarrell, informs us of an example which was washed ashore near North Queensferry, in July, 1835, and it was found by those who ate it to have its flesh red, and as good as that of a Salmon, which it also much resembled in flavour. It has also been sufficiently known in Scandinavia to have acquired the native name of Glansfisk.

Its discovery in England is of later date; and as there was not then any known reference to a description of it, a designation was adopted which it was said by an African prince to bear in his own country,—where, however, it is not certain it was ever seen,—and thenceforward it has been called by the name of Opah.

I have received information of an example that was obtained in the west of Cornwall, in the early part of the summer of 1835, which is so far remarkable that other specimens of this rare fish were taken in other places about the same date. One has been obtained in Devonshire also; but the larger number of British specimens have been taken in the north. One of these was secured in August, 1835, in the bay of Landadu, near Conway; another at Queensferry in the same year; and again another on the coast of Norfolk, in July, 1839. Mr. Norman, in the "Zoologist," mentions an individual taken off Flamborough Head in February, 1849. And we think it material to the history of a fish, the habits of which are so little known, to preserve those dates, as a contribution toward an explanation of the causes which may entice or drive it from its native depths. This species, in common with the Bergylt, affords an exception to a general remark—that those natives of the seas are the most splendidly adorned which inhabit the warmer and brighter regions of the globe, where the ocean is more shallow, and themselves under the influence of a tropical climate. The reverse of this obtains in the fishes we have mentioned; and it is probable that even the line of the fisherman has never elsewhere reached to so vast a depth as when it plunges to the regions in which they dwell. It is from the united evidence of Scandinavian and British observers that we class the Opah as an inhabitant of the deeper waters of the North Sea, from which it does not often emerge, and where its range appears to be a limited one, for it has not been seen off the coast of Greenland, nor anywhere eastward of the North Cape.

Individuals of this species have been found to measure in length from three to five feet; and an example of the former was sixteen inches in depth, with the head, from the snout backward ten inches. The jaws are equal, or perhaps the lower a little the longest, without teeth. Eye large. The slope is continued from the beginning of the dorsal fin to the upper jaw. Body more slender near the tail. Lateral line much arched at first, afterwards lower and irregular. The dorsal fin single, beginning above the middle of the root of the pectorals, the first rays long and decreasing, the fin proceeding moderately low, and spreading again at its termination: the anal does the same, but less conspicuously. Pectorals very long and pointed. Ventrals also very long, and far back on the body—abdominal. Tail broad and forked. The general colours are splendid red and green, with tints of purple and gold, dotted over with round silver-white spots; but in one instance, described by Nilsson, the spots of yellow and white were only below the lateral line. Iris of the eye scarlet, and the fins a lively red.

TRACHURUS.

The body compressed; the lateral line armed with firm plates, which have a raised ridge along the middle. Two dorsal fins, with a horizontal spine pointing forward before the first of these fins. Before the anal fin a few spines, either free or joined together with a membrane. Thoracic fishes.

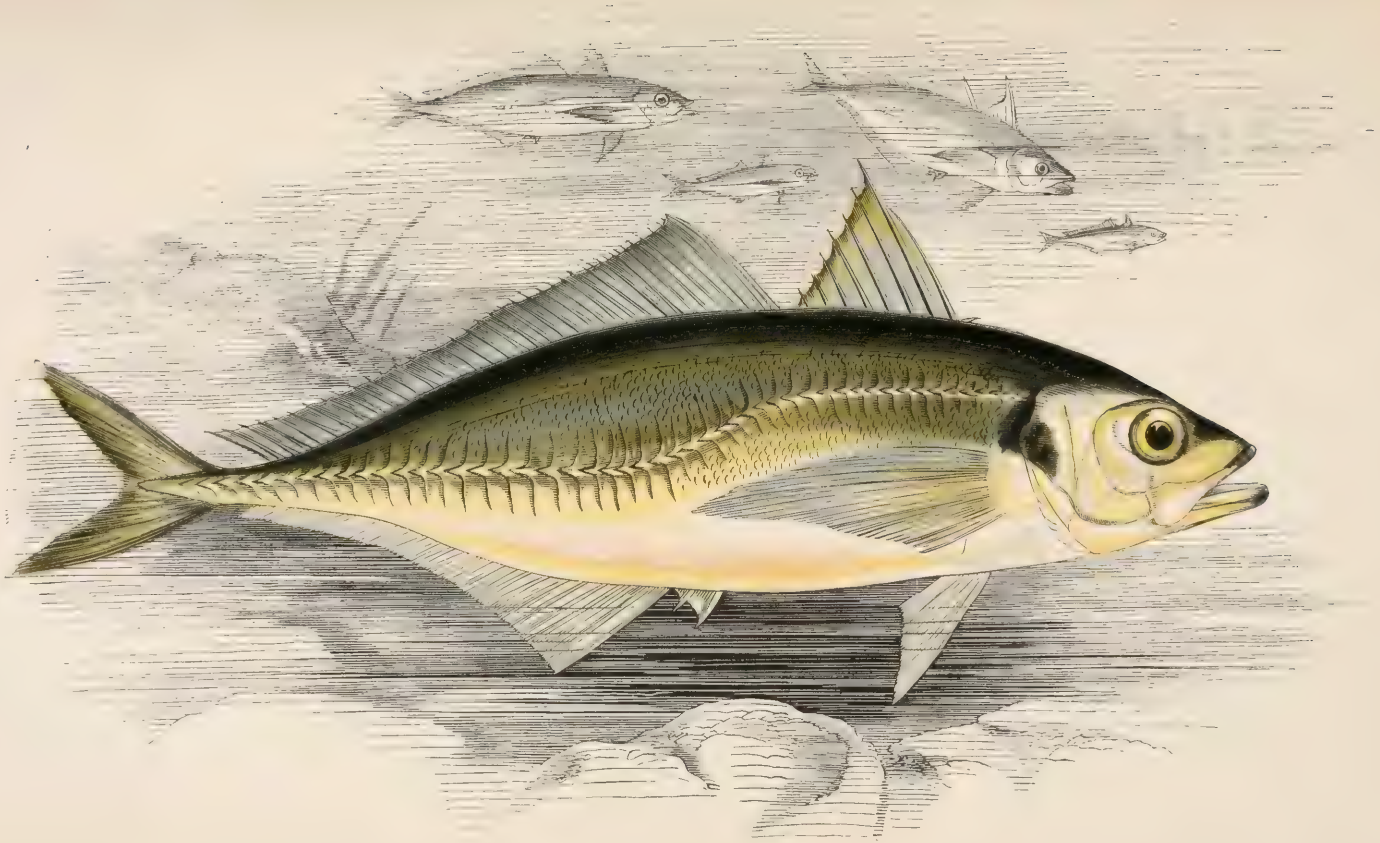
SCAD.

HORSE MACKAREL. CANORUM. BUCK MACKAREL.

Trachurus,	Jonston.
Scomber trachurus,	Linnæus.
" "	Willoughby; p. 290, Tables M. and S. 12.
Caranx trachure,	Lacepede. Risso.
" *trachurus,*	Cuvier.
Trachurus vulgaris,	Fleming; Br. Animals, p. 216.
" "	Jenyns; Manual, p. 367.
" "	Yarrell; Br. Fishes, vol. i, p. 175.
" *trachurus,*	Gunther; Cat. Br. Museum, vol. ii, p. 419.

There is perhaps no other fish so widely-distributed through the ocean as this, for it is not only found at times on every shore of the United Kingdom, but northward along the coast of Sweden, and towards the south through the extent of the Mediterranean; and further still—by Madeira across the tropics to the Cape of Good Hope, Australia, and New Zealand; the companion, in these last-named regions, as we are informed, of some other species of the same genus that have not been seen in European seas. Osbeck found it also in China; and specimens from the above-named regions of the east and south are preserved in the British Museum, which are not seen to differ in outward appearance or inward structure from others in the same collection that were obtained in our own country.

With us this species finds shelter in deep water during the colder months of the winter and spring, and does not shew itself within the reach of fishermen until about the beginning



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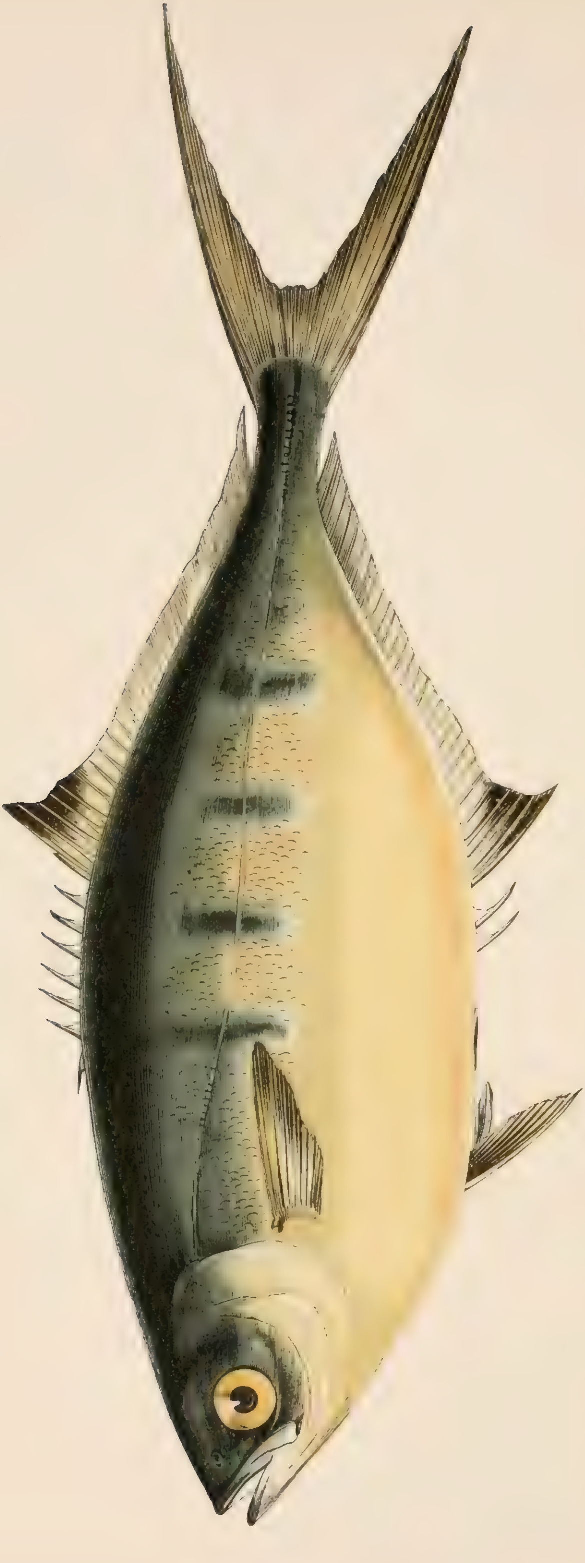
of April; but for the remainder of the year it is amongst the commonest of British fishes. Yet from its sensibility to the impressions of cold, there is considerable variation in its habits in the different parts of the British Islands; so that in Scotland, as well as in the north of the European continent, it is only known as a casual visitor whose motions are irregular and interrupted. As the only proof he knew of its occurrence in Scotland, Dr. Fleming adduces an instance in which a mutilated individual was found on the shore near the mouth of the Tay; and Mr. Thompson tells us that although known in the north of Ireland, it is abundant only in the south of that kingdom.

I have found the Scad with roe ready to be shed at the middle of July, and large numbers, scarcely exceeding two inches in length, were taken in the middle of October in the same year. Yet this cannot be its usual season of spawning, or it must produce its young twice in the year; for I have known them, not exceeding an inch in length, to be found in great numbers in the mouths and stomachs of large fishes, from the end of December, through January, to the middle of February. And again, I have known them, of the length of three or four inches, abundantly taken in August and September, in company with the young of the Common Mackarel of the same length; these last-named fish being well known as spawning on our coasts in June, and not later than the early part of July. The fate of these little fishes is sometimes unfortunate, as they come to the surface for the benefit of the warmth and sunshine; for as they huddle close together they are assailed from below by murs and guillemots, which dive beneath, and terrify them from seeking safety in the only way in which it can be obtained, while multitudes of gulls rest on the water and devour them at their pleasure. These last-named birds are so closely pressed together, that there is no room for those which have come the last, but in alighting on their comrades, which thus are compelled to make room and rise aloft. In this way there is a constant motion among them, until the diving birds beneath are gorged to the full, and make way for the fishes to escape by sinking beneath. In September and October it is usual for Scads, of the length of about seven or eight inches, to be caught in considerable abundance in the drift-nets shot for Pilchards; but such numbers of this size have also been taken in July, that they have been sold at the rate of sixpence the hundred, (of one hundred and twenty fish.)

Full-grown Scads are for the most part solitary, and swim low in the water, where they take a bait freely, but much less frequently when the boat is under sail. On some occasions, however, they gather into vast multitudes, and pursue their prey, especially the Launce, with such reckless impetuosity that considerable numbers of them are thrust upon the shore. On one occasion, in the Mount's Bay in Cornwall, ten thousand were brought together within the compass of a ground-sean; and on another occasion upwards of twenty thousand were taken, and at the same time, as evening advanced, men, women, and children rushed into the sea and grasped the fish with their hands, amidst the shouts of spectators who had assembled to see the sport. The prize indeed is not of great value, for this fish is not held in estimation for the table; but it is not distasteful to every palate. Lacepede speaks well of it, and in the west of Cornwall and Scilly Islands, as also in the north of Ireland, where it is called the Crake Herring, they are salted like other fish, and preserved dry for use in the winter, when rough weather may have shut up all access to the sea for fishing.

The Scad grows to about a foot in length, the general form moderately compressed; jaws equal, with small teeth; eyes large. Body more slender towards the tail. Lateral line bent down opposite the expanded portion of the second dorsal fin, armed with plates through its length, which rise into a ridge as it approaches the tail; the middle of each plate with a point directed backward, their number liable to vary. The first dorsal fin with eight firm rays, of which the third is the longest; before this fin a recumbent spine, the point directed forward. Second dorsal close to the first: it and the anal wider at their origin, narrower in their course, ending near the tail, which is forked. Pectoral fin pointed, reaching to the curve of the lateral line. A small fin, with two short rays, in front of the anal, in a depression. Ventral fins a little behind the root of the pectorals. Colour of the back dusky green, with tints of blue, and a couple of obsolete lines of yellow; the belly lighter, with shades of blue, green, and red; on the borders of the gill-covers a dark spot.



LICHIA.

The body compressed, deep, slender towards the tail, which is forked. A single dorsal and anal fin; opposite each other, and proceeding near the tail. Free spines before the dorsal fin, the first of them pointing forward. Free spines also before the anal fin. Ventral fins behind the root of the pectorals.

DERBIO.

Glaucus,	Jonston; Table 1, f. 11.
Glaucus primus Rondeletii,	Willoughby; p. 297, Table S. 15, f. 1. He describes what Jonston represents—the dorsal spines united by a membrane, which appears not to be the usual condition. In Cuvier's figure there is a slip of membrane to each spine.
Scomber glaucus,	Linnæus.
Lichia glaucus,	Cuvier.
Coranx glauque,	Lacepede.
Centronote glaicos,	Risso. Yarrell; 2nd. Supplement, p. 23.
Centronotus binotatus,	Rafinesque.
" "	Gunther; Cat. Br. Museum, vol. ii, p. 477.

It may be supposed that this fish obtained its ancient name of Glaucus from its light or sea-blue colour, but it became also the proper designation of the species, in the same manner as we apply the name of blackbird to a well-known bird as peculiarly its own, although there are others to which it may, as a description, be equally adapted. This fish was also called by an analogous designation in Greek, but in the latter instance there is much uncertainty in its application. Thus, in one place Oppian speaks of a species which he calls Glaucus, (Halieutics, B. i, line 170,) which he associates with the Gilthead and the other sorts of Sea Breams, as frequenting stony or sandy ground, and this name the translator renders by the term

Blueling; but near the end of the same book he clearly applies the name to a different fish, which cannot be any other than the Blue Shark, (line 749.) Nor can it be an objection to this, that he represents this latter species as depositing its eggs before they are hatched. The alleged love of the parent to its young, and its habit of giving them shelter in its mouth—whatever may be judged of the truth of this trait of character—is decisive on this point, and it was from a persuasion of this that the translator in this instance renders the name of Glaucus by that of the Blue Shark.

This fish is common through the whole extent of the Mediterranean, and was much esteemed for the table by the people of Greece and Rome. Southward from thence, we are informed that it is also found at the Cape of Good Hope, and across the Atlantic Ocean on the coasts of Brazil; but it is only in a single instance that it has been met with in our own country. This example was caught by a fisherman of Mount's Bay, in October, 1857, and from it several photographs were taken, one of which is in my possession; but our figure and description are from the fish itself, shortly after its capture. Its peculiar habits are but partially known; but there is no doubt this is the fish of which Pliny expresses the popular belief that, in order to escape the heat of summer, it ceases to be seen for the space of sixty days. Ovid refers to the same habit, in saying of it,—

> "Et nunquam æstivo conspectus sidere Glaucus;"
> "The Glaucus, never seen in summer's heat."

The extreme length of the specimen was thirteen inches and a half, and to the fork of the tail eleven inches and a fourth; depth, immediately under the dorsal spines, three inches and seven eighths. The body compressed, slender near the tail. The under jaw a little the longest. Eye large, low on the cheek; nostril midway between the eye and the snout. Vent about an equal distance between the ventral fins and the separate abdominal spines, or a little nearer the latter. The lateral line at first slopes downward, and then passes with a slight undulation to the tail. Seven elevated dorsal spines, the hindmost united to the dorsal fin, and another in front, prostrate, and pointing forward. Two free spines a short distance before the anal fin. Dorsal and anal fins at first elevated, gradually becoming narrower, and ending opposite each other, not far from the tail, which is deeply forked; the lobes slender and pointed. Pectoral fins moderate; ventrals small, behind the root of the pectorals. Colour on the back decided blue, from which four bands stretch down the sides. The belly light yellow, with pink tints. Upper part of the origin of the dorsal and anal fins with a distinguished dark blotch. Iris of the eyes yellow.

CAPROS.

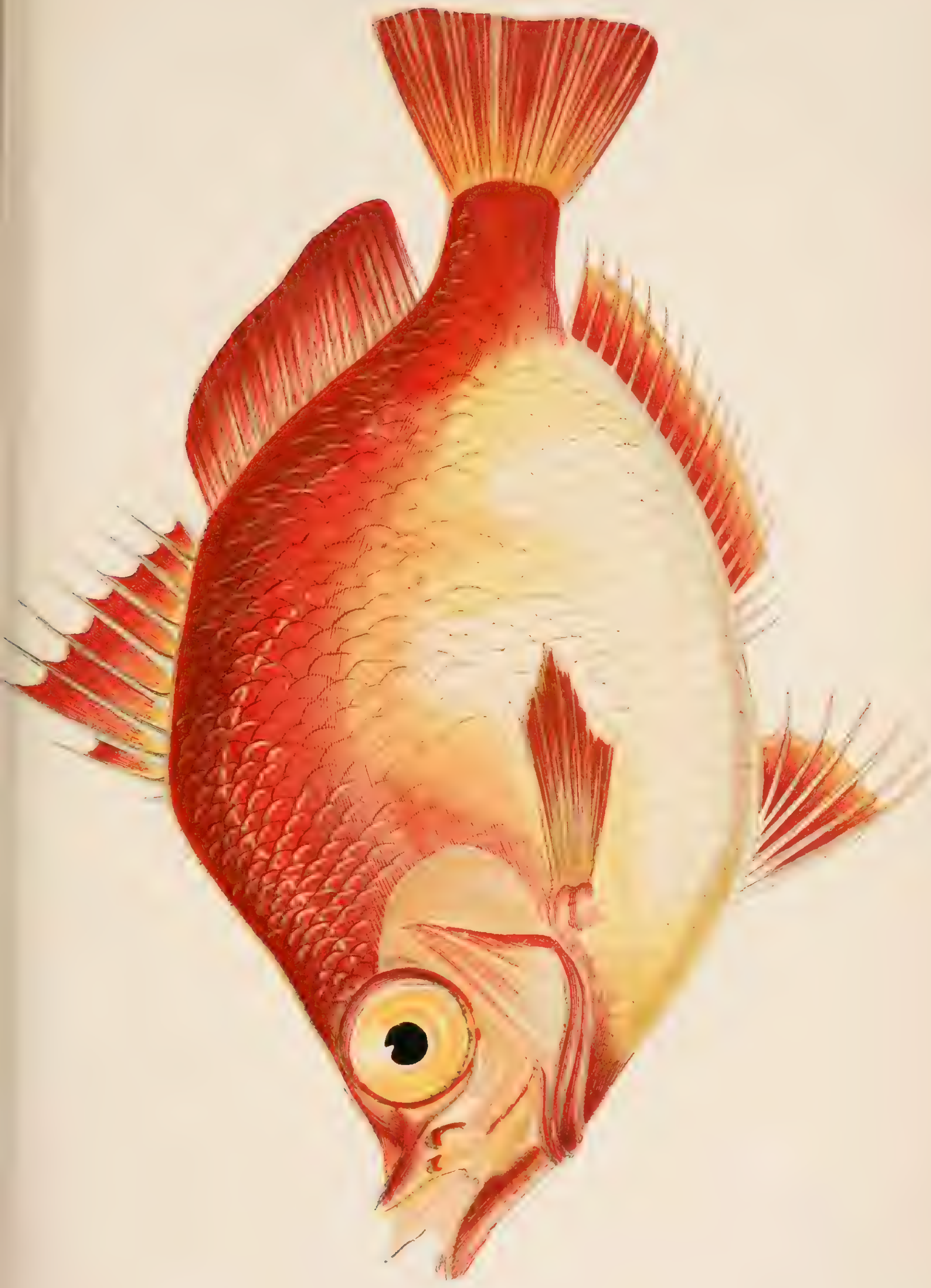
The body compressed, deep, covered with rough scales. Mouth capable of great extension. Dorsal fins two, close together; base of the dorsal and anal fins without spines. Ventral fins thoracic.

BOARFISH.

Aper,	Jonston; pl. 1, f. 8. Willoughby; p. 296.
Zeus aper,	Linnæus.
Capros aper,	Cuvier.
“ *sanglier,*	Lacepede. Risso.
“ “	Jenyns; Manual, p. 368.
“ “	Yarrell; British Fishes, vol. i, p. 190.
“ “	Zoologist, vol. i, p. 191.
“ “	Gunther; Cat. Br. M., vol. ii, p. 495.

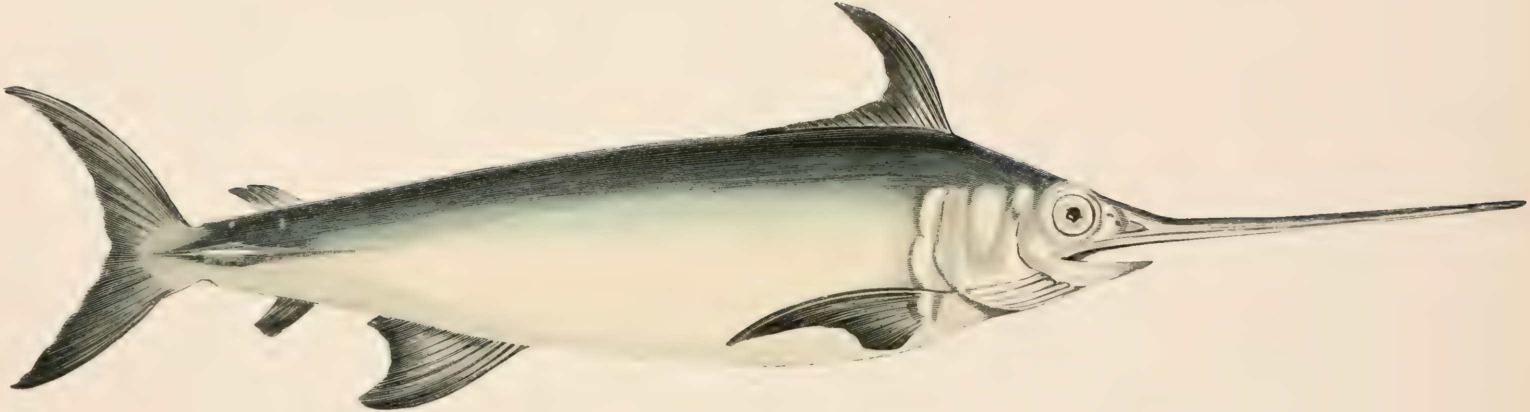
This fish obtains its name from the shape of its snout, which is turned up, and capable of being greatly protruded. The spines also of its first dorsal fin are stiff and long, added to which it exudes a strong and unpleasant smell, and, if the Boarfish mentioned by Pliny as being found in the River Achelous be the same, is accustomed to utter a grunting sound; all of which were supposed to point out a sufficient resemblance to a boar to warrant the appellation.

It is known in the Mediterranean, and usually has been regarded as a species of rare occurrence. But it is only necessary to find its haunts to be able to pronounce it locally abundant. It was first discovered to be a British fish by Dr. Henry Boase, who obtained a specimen at Penzance; and, in the second place, an example was procured at Bridgewater, by Mr. William Barker. In the first volume of the "Zoologist," page 191, is an account, with a figure, of one that was found on the shore at Brighton, and which was thought worthy of the notice of royalty. Since these I have known two caught



by a trawler of Plymouth; and a single individual was brought to me in January, 1852, by a boy who found it entangled in ore-weed in the harbour of Polperro. I possess a record of eight examples obtained at Falmouth in the space of three years; but the whole of these instances signify little in comparison with the numbers which have been since taken in the west of Cornwall, on the first adventure of a trawl-vessel from Penzance, which was in July, 1844. The place where these examples were found was close to the Runnel Stone, near the Land's End, and on the first day sixty were brought to land, while several others had been thrown overboard as worthless. Within a few days after this two others were caught, and in the course of a single week afterwards, a hundred more were captured; the numbers finally taken and subjected to examination exceeding two hundred. Further observation has shewn that these fishes may always be found within half a mile of this well-known rock, where they are probably induced to assemble by congenial food; but they are scarce, or not to be found beyond that distance. Small crustaceans were the only food found in any of these specimens.

The numerous examples of these fishes varied in length from five to seven inches, which therefore may be regarded as the usual dimensions of the species. The depth of one that measured seven inches, in front of the first dorsal was three inches, and the girth seven inches. The snout is lengthened, and is capable of being protruded beyond its ordinary length, to the extent of seven eighths of an inch. Above the eye the head is narrow, and the outline is then arched concavely upward and backward in a waved form to the origin of the first dorsal, which is the highest elevation, from whence it slopes backward to the stalk of the tail. The eye is large, round, five eighths of an inch in diameter, and the same measure from the snout when the mouth is closed. When extended the snout is membranous, and surrounded anteriorly with a rim of bone, forming the jaws, on the upper part of which is a long stout bone, which passes into a conspicuous socket between the eyes; and anteriorly it expands on each side like two wings which terminate in two horns. From the orifice of the socket posteriorly a small slight bone passes obliquely downward and forward to meet another from the rim of the mouth, thus forming a nearly equilateral triangle with the base above. The rim of the lower jaw is attached loosely to the anterior side of the triangle, and when the mouth is closed the whole of this mechanism resembles a mystache. It is not easy to imagine a more skilfully-constructed contrivance than this of the Boarfish's mouth for sudden motion in the capture of the very small but nimble creatures on which it feeds. The teeth are small. Scales numerous, large, finely serrated and ciliated, so that the surface of the body has a beautiful silky appearance, over which if the hand be passed backward it feels smooth, but rough in the reverse. The lateral line is not well marked, but is plainly apparent through the first third of its length, and may be traced throughout. It rises about the fourth of an inch behind the eye, arches upward near the dorsal fin, and afterwards is bent down. Origin of the dorsal, ventral, and pectoral fins nearly in a straight line, that of the latter being rather in advance. First ray of the first dorsal very stout, very short, and almost unconnected with the others; second ray five times as long as the first, and curved backward, as are all the others; the third is the longest, after which the remainder become shorter. All these rays stout, and, with the exception of the first three, are stoutest in the middle; they are longitudinally striated, and the first three are more elevated at their root than the others; no scales at their base. The second dorsal is soft and placed on a ridge. In the abdominal fin the membrane does not extend to the end of the soft rays. In none of these specimens were the first rays of the dorsal fin serrated, but the first ray of the ventral was strongly so. The tail straight. Colour of the eye, when recent, bright yellow and silvery white; of the body fine crimson, delicately bright, faded into yellow, and from thence to a silvery white as it approached the belly. In none of them were there lateral bands, as are sometimes described, and as was the case with an example at Falmouth. In the specimen obtained at Polperro the rays of the ventral fins were purple at their points and red at the root. Rays in the first dorsal fin nine, in the second twenty-four; in the pectorals thirteen; ventral six; anal twenty-seven, of which the first three are spinous; caudal fourteen.



SWORDFISH

XCVII

XIPHIAS.

The body moderately long and compressed. Upper jaw very long, narrow, firm, and depressed; under jaw much shorter; mouth without teeth. Side of the body near the tail ridged. No ventral fins; and on this account it is classed by Linnæus in his order of apodal fishes. This family has received the name of Swordfishes from their long and narrow projecting snout, which is formed of the premaxillary bones, closely united together, and firmly articulated with the prenasal and maxillary or upper jaw bones. Swordfishes are divided into several genera, two of which, at least, are furnished with ventral fins; but there is only a single species which is known with certainty to visit our coasts. Yet there is some reason to suppose that another species, an inhabitant of the Mediterranean, may also come to the British Channel. Mr. Edward Chirgwin, of Newlyn, near Penzance, who was acquainted with most of the fishes of the western coasts of England, informed me that he had obtained four examples of the Swordfish, in three of which he found an air-bladder, the possession of which is an acknowledged character of the *Xiphias gladius,* presently to be described. In his other specimen this organ was not found. A fisherman also informed me, that while observing a Swordfish, which sprung out of the water at no great distance from him, besides the pectoral fins, he noticed fins that projected below the belly; a character of the other fish of this family, (*Tetrapterus Belonè*) which is also found in the Mediterranean, but not yet recorded as British.

SWORDFISH.

Swordfish,	Jonston; pl. 4. Willoughby; p. 161, tab. S. 27.
Xiphias gladius,	Linnæus. Cuvier. Bloch; pl. 76.
Espadon,	Risso. Fleming; British Animals, p. 220.
Xiphias gladias,	Jenyns; Manual, p. 364.
" "	Yarrell; British Fishes, vol. i, p. 164.
" "	Gunther; Cat. Br. M., vol. ii, p. 511.

This fish, which is not less remarkable for its habits than its form, is seen not unfrequently on our coasts in the summer and autumn, and, when with us, it shews itself as one of the most active of our visitors, occasionally springing above the surface; an action supposed to be caused by the irritation it suffers from the torment inflicted by a parasitic animal that sometimes pierces through the skin beneath the pectoral fins. It is probable, however, that this leaping above the surface, which has been witnessed by our fishermen, is frequently to be attributed to a wanton exuberance of spirits; and although many instances are recorded of the capture of this fish in Britain, we are not acquainted with one in which the attention of observers has been drawn to the presence of this supposed enemy.

I have several times been told by fishermen that this fish has shewn itself near their boats; and it appears surprising that it is not more frequently taken, since its well-known swiftness may be judged likely to cause it to become entangled in the floating nets which, in the season of its visits, are spread along the whole extent of our waters. But the only instance of its capture in this way, that has come to my knowledge, was in October, 1861, when an example became entangled in some drift-nets, about two miles from the Wolf Rock, near the Land's End. The larger number have been in seans near the land, at a time when its wandering disposition has brought it into shallower water than its usual habits would have rendered likely. According to Ælian, when thus enclosed in a sean, it often succeeds in delivering itself from the danger by means of its sword-like snout, which tears the meshes, and sets free the Tunnies as well as itself.

Its general safety must be ascribed to instinctive vigilance; for we can scarcely ascribe it to fear when we know it to be a portion of the character of this fish to assault with violence the mighty bulk of a Whale, when chance may bring them in sight of each other. That the Swordfish has been seen not unfrequently to do this has been long asserted by sailors, although doubted or disbelieved by some who were not in circumstances to be able to form a satisfactory opinion upon the subject. But instances of this nature have been so often warranted by men who, although not acquainted with natural history as a science, were practically accurate observers, that no reasonable ground of disbelief can be permitted to remain, although the motive which leads to such forcible display of enmity must remain beyond our power to imagine. In the month of August, 1861, near Westray, one of the northernmost islands of the Orkneys, an individual of the smaller species of Whales, known as the Herring Hog, was attacked by a Swordfish; and when thus compelled to leap out of the water, which it did to the height of six feet, it was observed that the sword had been thrust into the Whale's body behind the pectoral fins. Its leaps continued, and then it was perceived that a Thrasher was assailing it on the sides. The Whale appeared as if near death as the three passed near the boat in which the observers were.

If the usual incitement of appetite be supposed in this case, it can only have been gratified with blood; for the Swordfish has no teeth to tear the flesh, and, from the structure of its mouth, the food can only be swallowed whole. Dr. Fleming found the remains of Cuttles *(Sepiæ)* in its stomach; and, besides these, it has been known to feed on small fishes. Oppian says that it easily devours the Hippuris, which we suppose to be the species of *Coryphæna* at this time so named; and Captain Beechy, in his voyage to the Pacific Ocean, mentions an instance in which a Swordfish (perhaps not the European species) made an attack on the tin case in which a thermometer was let down into the sea, but it did not succeed in carrying it off.

It becomes still more difficult to imagine a cause for the angry feelings of the Swordfish, when we discover that in this persecution of the Whale, the attack is shared by a fish with which it does not appear to possess any similarity of feeling or habits. Yet the strange contest has been witnessed in many instances, where the Thrasher (Shark) has put forth all its powers of exciting terror, while the Swordfish has carried on its more formidable warfare, by rushing at and piercing deeply its giant victim—even to the death.

But the Swordfish is not always on the conquering side; and I possess a memorandum, from the mouth of a sailor who watched with interest the anxious motions of one, which he supposed to be eight or nine feet in length, as it was followed closely and rapidly in all its turnings, by a Blue Shark. Twice did it leap above the surface to escape the near approach of its pursuer, but with what success at last the observer had no opportunity of knowing.

It probably arises from mistaking a ship for a Whale that this fish is sometimes known to dart on the former, and by this error inflict on itself the destruction it had meditated for its opponent. Notices of such an occurrence are met with in the writings of Ælian, who refers to a particular instance of what Pliny mentions only in general terms. The remark of the last-named writer is, (B. xxxii, C. 6.,) that the Swordfish has a sharp-pointed snout, with which it is able to pierce the sides of a ship, and send it to the bottom; instances of which have been known near a place in Mauritania, known as Cottè, not far from the river Lixus, on the African side of the Mediterranean. Ælian was so little acquainted with this fish, that in one place he supposes that the injury was inflicted with its fin; but he afterwards describes it with some degree of accuracy, and compares the sword to the beak of the ship known as the trireme, which was rowed with three banks of oars. He mentions an instance that was much talked of, where not only the fish was killed, but its head was torn from the body by the motion of the ship, while the sword remained fixed in the plank. He adds also that the Swordfish is frequently seen in the Black Sea, and delights to enter fresh water. Accordingly it is met with in the Danube, where, with several other fishes, it was sometimes caught on the breaking up of the ice towards the end of winter. This occasional habit of entering fresh water is comfirmed by a narrative of Daniel,—mentioned also by Southey,—that a man was killed by one of these fishes while bathing in the Severn, near Worcester; and, to establish the certainty of the fact, the fish was afterwards caught. I have also been informed that a Swordfish, supposed to weigh nearly three hundred pounds, was caught in the river Parrett, near Bridgewater, in July, 1834.

Several instances in which large ships have been pierced with the sword of this fish are known in modern times, and the blow has been struck with such force, that not only the thick plank of an East Indian merchant-ship has been pierced through, but the timber, or rib by which the plank was strengthened, was penetrated to such a depth as no man, with all his force, could have driven a bolt. A relic in testimony of this is preserved in the British Museum. In the year 1860 it was reported in the newspapers that a Swordfish was found to have driven its sword through the double copper sheathing of a ship, and then through a plank of the thickness of two inches and a half, deep into one of the ship's timbers, where it broke. We quote another instance, in which the editor speaks in his own person:—"We have had the pleasure of inspecting a piece of wood cut out of one of the fore planks of a vessel, (the Priscilla, from Pernambuco, now in the port of Liverpool,) through which was struck about eighteen inches of the bony weapon of the Swordfish. The force with which it must have been driven in affords a striking exemplification of the power and ferocity of the fish. The Priscilla is quite a new vessel. Captain Taylor, her commander, states that when near the Azores, as he was walking the quarter-deck at night, a shock was felt which brought all hands from below, under the impression that the ship had touched upon some rock. This was, no doubt, the time when the occurrence took place."

> "Nor burnished steel, nor plates of flaming brass,
> In solid work the fishy snout surpass."
>
> OPPIAN.

The flesh of the Swordfish is thought delicious, and Linnæus, who met with it in Norway, compared it in taste to the Salmon. To obtain it in the Mediterranean there is a regular fishery, which has been carried on from ancient times, and which, with some variation, is described in the poem of Oppian, B. iii. A man, who answers to the huer already mentioned in our account of the Tunny fishery, is stationed in some elevated place, where he can discern the course and motions of the expected fish, and from whence he can communicate with the fishermen afloat, whose course is directed by his signals. The excitement of the chase is highly amusing, and much skill is shewn in use of the dart with which the flesh is struck, and which is fastened to a line that is suffered to run out, but is tightened to restrain the exertions of the fish. What follows is a counterpart, on a small scale, of what is practised in the Whale fishery; and the time and patience engaged in the efforts to obtain the prize are spoken of as not a little considerable.

Oppian describes another and a very ingenious practice, that displayed a minute acquaintance with the habits of this fish. A bait was employed, but it was fastened with a sliding noose to the line at a distance above a naked hook; and the whole was so contrived that when the Swordfish seized the bait with its mouth, it should glide along, until, by the force of its motion, it was thrust upon the hook below, the sudden shock of which was a signal to the fisherman of the success of his skill. The Swordfish is said to be fond of the society of its fellows, and not to wander without some one to accompany him; and this again formed the foundation of a stratagem to entice it to its destruction. An artificial imitation was made of its own form, and when, in obedience to the attraction, it was brought near the boats that closed around it, the dart was thrown; and when, in spite of its struggles, it was dragged within reach, a blow upon the head deprived it of the power of further resistance.

A usual length of this fish is from eight to ten feet, but Willoughby, as well as Rondeletius, have known it to reach to fifteen feet. An example which measured seven feet and a half, was, in its greatest depth, one foot, and in thickness nine inches. In a fish ten feet in length, the girth was three feet. The comparative length of the snout or sword appears to vary, since in some it is described as equal to the length of the body, and in others to one third. At its origin the breadth of this organ is about the fifth part of its length, from whence it proceeds flat and tapering to a point. The under jaw is short, pointed, and about a fourth part of the length of the upper; but there is reason to suppose that the relative length of the two is more equal in young examples. The head slopes from the front of the dorsal fin to the beginning of the snout. Eye large and prominent. Body thick near the head, a little compressed further back, becoming more slender near the tail, and, at the root of this organ, above and below, a depression. On the sides, behind, a raised border or keel, as in the Tunny. The scales hid in the skin.

The dorsal fin begins very high, opposite the edge of the hindmost gill-cover, and it passes on, narrower, to near the tail, where the last rays are again lengthened; and, in old examples, the middle rays of this fin have altogether disappeared. The vent is behind the middle of the body; and the anal fin, although shorter, in other particulars resembles the dorsal. The pectoral fin is situated low down, and its upper rays are long and pointed; the tail deeply forked. The dorsal fin, when complete, has, according to Risso, forty-two rays; anal eighteen; caudal twenty-six; pectoral seventeen, which are firm and bent like a scythe. The colour is dark, almost black on the back and tail, lighter on the sides, and white below; but in the Mediterranean the back is described as being of a steel blue. Pectoral fin yellow.

Doctor Caius, (Keys,) who lived in the middle of the sixteeth century, and wrote a well-known "Natural History of British Dogs," was the earliest of modern writers who notices this species, which he did in a communication to the naturalist Gesner, where he particularly describes the sword-like snout, from a dried specimen. He says that the upper part of this beak is altogether hard and bony, and, as Aristotle says, equal in length to the rest of the body. It is formed of two bones, which are so closely joined along their course from the point, as to appear like a single bone. Near the head they gradually separate, so that the upper one rises in a broader form, to constitute the skull, and the lower becomes the bone of the palate,—the brain and eye being thus situated between them. Along the middle of the beak or sword there runs a depression and a shallower one on each side of it, with a suture on the lower side; nothing of which can be discovered in the recent specimen.

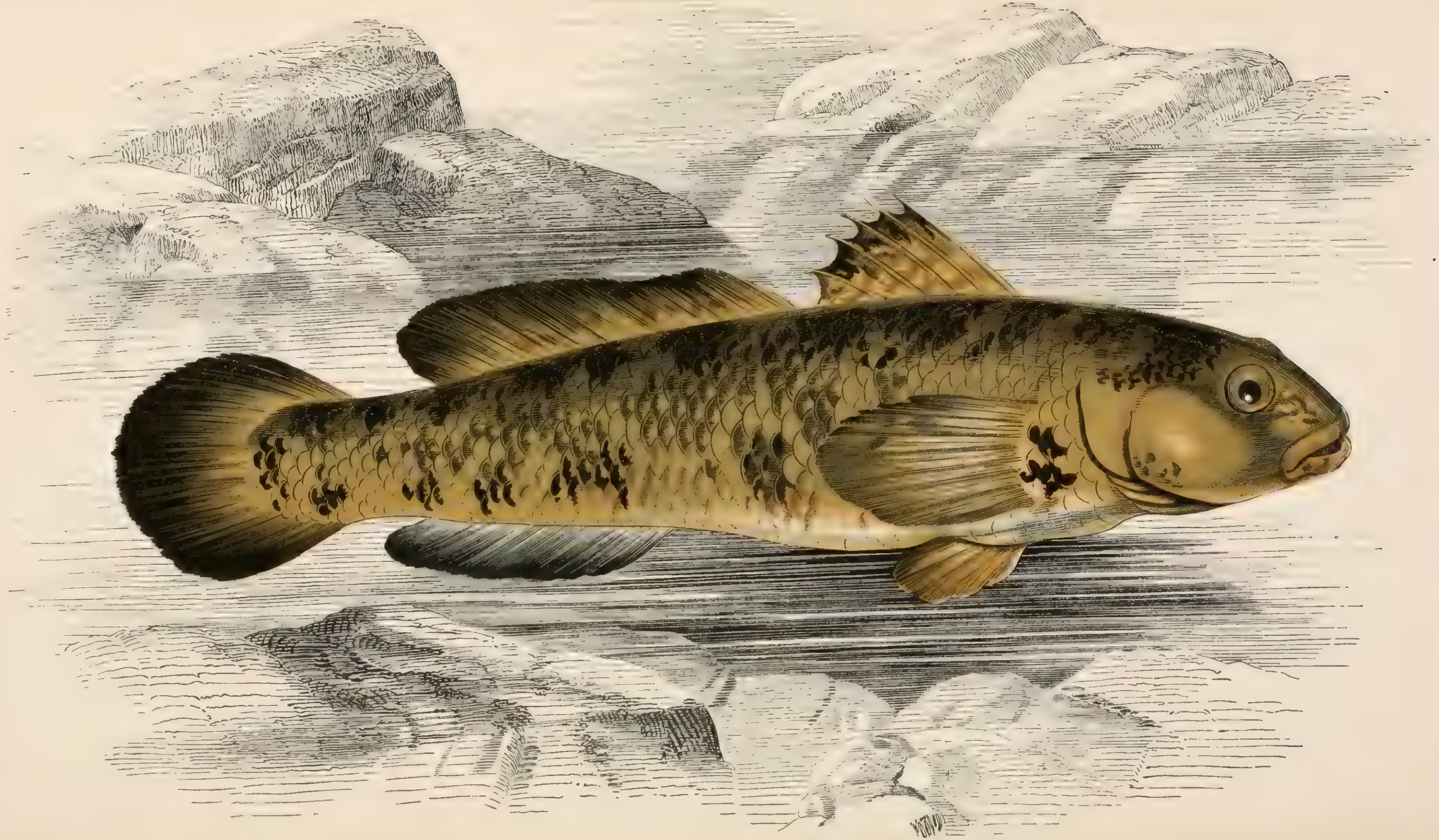
It has been observed that in the development of fishes from the egg, the ventral fins are the last of all the organs to make their appearance. Their absence, therefore, in many genera constituting the order of apodal fishes in the system of Linnæus, is to be understood as an arrest of development, and of which the genus *Xiphias* approaches the most nearly to the orders above it, by its close affinity to other Swordfishes which have these fins in perfection.

GOBIUS.

The head short before the eyes; cheeks full; eyes high on the head. The body moderately compressed. Dorsal fins two, the first with unbranched but flexible rays; tail round. The ventral fins thoracic, and united together, more or less in the form of a funnel at the root.

Some species of this family are to be met with in almost every part of the world, and so numerous are they in the warmer portions of the ocean, that in Dr. Günther's "Catalogue of the Fishes Preserved in the British Museum," chiefly procured in these regions, upwards of a hundred and fifty kinds are specified, which may prove at last to be no more than a moderate portion of the whole race. But the whole of this numerous family are of small size, and many of them bear a near resemblance to each other; and, as the species are also subject to variation in colour, and, in a less degree, even of form, it happens that a considerable amount of uncertainty attends the attempt to distinguish the species, even in those which have been recognised as natives of our own seas; a circumstance which renders it still more difficult to decide upon the correctness of the synonymes applied by other observers; and the difficulty is scarcely lessened, if at all, by a reference to the figures of them that are contained in books, or by the descriptive names which have been arbitrarily applied.

An attempt thus to assign the species has been made with much care, but with little satisfaction to myself: it has therefore been thought more advisable to avoid the further perpetration of error, by confining myself to the description and figures of such as have fallen in my way after a rather extensive and diligent search; and that the reference to the synonymes of other writers should only extend so far as I feel confidence in their accuracy, with the expression of a doubt in cases where our figures and descriptions do not closely agree. In one or two cases only is a species described as different from any one generally recognised; and this is done with no other intention than to place on record fishes which seem to be so far removed from those hitherto known, as at least to demand further research. There is a limit to variation even in the most variable; and there are instances where creatures which had long been regarded as only varieties of known kinds, have, on further inquiry, been admitted as true species,—an observation that may be applied to these fishes as well as to others.



ROCK GOBY

XCVIII

ROCK GOBY.

BLACK GOBY. MILLER'S THUMB.

Black Goby,	Jonston; Table 15, f. 11, 12.
" "	Willoughby; p. 206, plate N. 12, f. 1.
Gobius niger,	Linnæus. Cuvier. Bloch; pl. 38.
" "	Jenyns; Man., p. 305.
" "	Yarrell; Br. Fishes, vol. i, p. 281.
" "	Gunther; Cat. Br. M., vol. iii, p. 11.
Gobie Boulerot,	Lacepede. Risso.

The name of Black Goby, by which it is often designated, cannot with propriety be applied to this fish, which is met with most frequently of a mottled greyish brown colour. We therefore prefer a name taken from the rocks, among which it commonly chooses to live, and where its peculiar habits are more remarkably displayed. It is common on shores of this description throughout the coasts of the British Islands, and from the Mediterranean to the north of Europe. It is also abundant in the Baltic, although of smaller size than with us; but it is rare in other ground than that mentioned above.

It is not easy to understand how this fish is able to obtain access to some situations in which we find it, and in which it reaches its largest size, and becomes adorned with its richest colours. It breeds in the open sea, but there are pools in the rocks, of such elevation that it is only in very high tides or stormy weather that the water of the ocean can flow into them; and into many of them a rill of fresh water is constantly dribbling, so that the fluid becomes so fresh as to lose even the taste of salt. These are the favourite resort of the larger Gobies, and we can only explain how these fish have been conveyed into such places, by supposing that they have seized an opportunity when the tide has been of unusual height. But in these pools they continue for life, safe from the depredations of the shag and cormorant, which are ever prowling round the shores in search of the smaller fishes they can meet with there. The pools are clothed with green oreweeds, on which the Gobies sometimes feed, for I have found it in their stomachs, yet it does not appear natural to them, for I have seen it, as it has passed into the intestines, very little, if at all digested. Their more appropriate food seems to be the abundance of crustacean animals which are bred in these haunts, and they are seen to rise to the surface, and seize the flies that have alighted for a moment to rest themselves. They take an appropriate bait eagerly, and I have taken a Shanny of two inches in length from the stomach of a Goby that but little exceeded six inches. When they have seized their prey of a size greater than they are able to swallow with ease, they carry it off to a safe place, and there appear as if struggling with it in the act of devouring it.

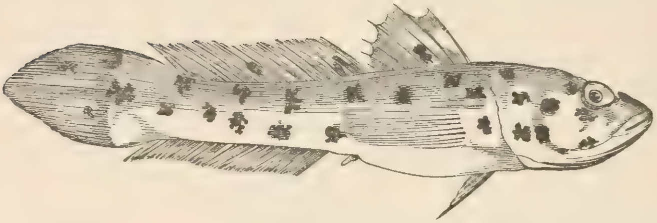
This fish has a sharp sight, and, when alarmed, which is easily effected, it darts away for shelter to some well-known crevice, where its colour, which resembles that of the rock, secures it from discovery. When at ease it rests on the ground, but there is no reason to suppose that the characteristic structure of the ventral fin affords any power of adhering to the substance on which it rests, and when kept in captivity the use made of it appears to be only for mechanical support. When once settled in their limited domain, it does not appear probable that they ever leave it again, since I have never met with them of proportionate size in other situations; but those which keep on the open shore are usually in oozy places, where, when the tide has left them, they find concealment under a stone. They are equally capable of living in fresh and salt water, and even if changed suddenly from one of these to the other. I have found an individual with enlarged roe in February, and very young ones, which appeared to belong to this species, in the autumn.

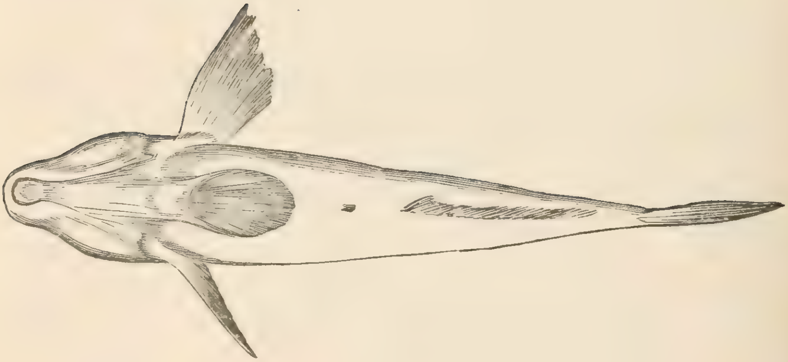
If we may trust the poet Martial, there was a Goby that was highly valued for the table by the people of Venice in ancient times; but with us the whole of them are of small account as food.

The largest I have seen measures nine inches and a half in length, but from six to eight inches is a more usual size. The head and fore part of the body are thick, but narrower before the eyes; the back broad, but the whole more compressed posteriorly; cheeks full. Eyes moderate, high; gape moderate; lips fleshy; teeth sharp; under jaw a little the longest. Dorsal fins two, close together, the first beginning opposite the ventral fins, having six rays, which are simple and flexible, and decrease in length from the first; the second dorsal has fifteen rays, of which the two last are from one root, the last being bent forward to meet its fellow, (but this arrangement is not constant, and consequently does not afford a distinguishing character.) Anal fin shorter than the second dorsal, with thirteen rays, the first and last united in pairs, and the points of these and of the second dorsal bound down with membrane. Pectorals and tail round; ventrals united into a single fin, with ten fan-shaped rays, which at the root are united by a membrane forming an enclosed cavity. Between the vent and anal fin a free process. The colour varies according to the ground: sometimes an intense black, but much more frequently a greyish brown, mottled with darker brown and yellow; darker on the head and back, and the circular border of the tail.

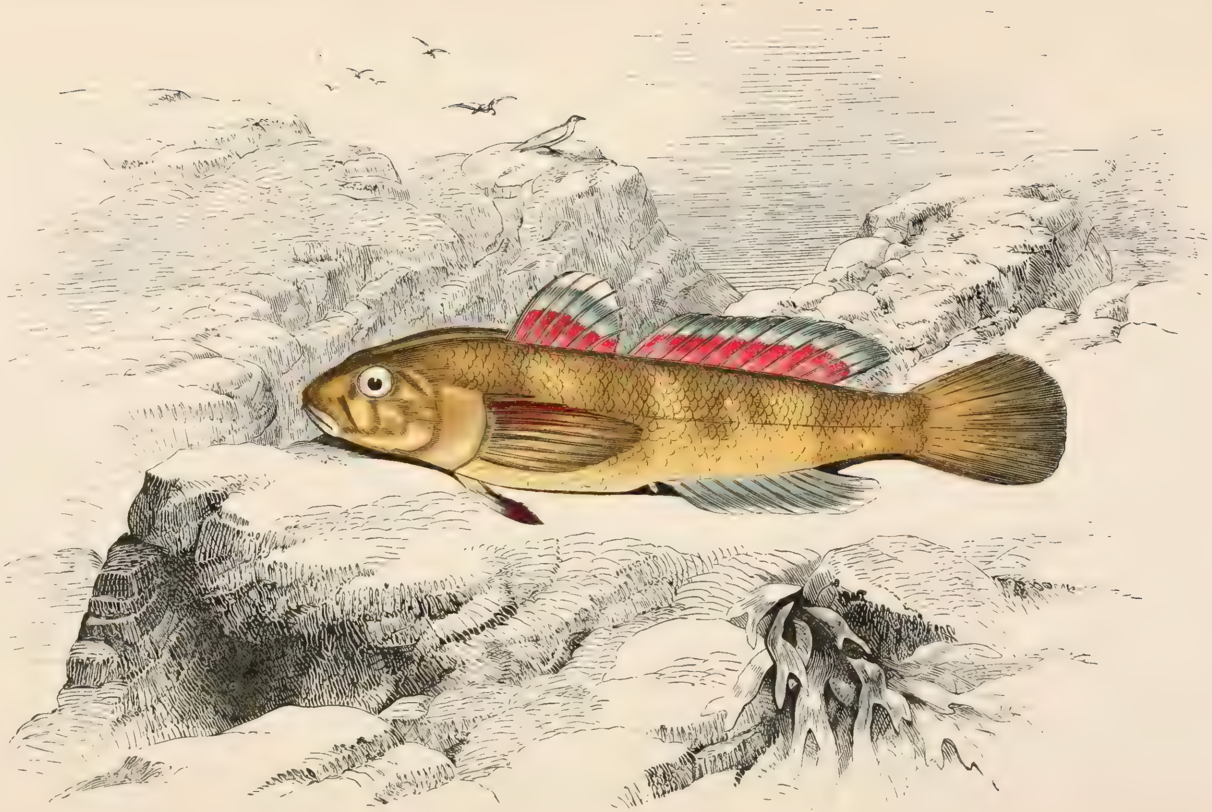
On one occasion an example was obtained of about three inches and a half in length, which differed so greatly in appearance from what is usual with the Rock Goby, that I was at first inclined to believe it a distinct species; but further examination has led to a change of opinion in this respect. It appeared as if emaciated, with the head not so high, the body more shallow and compressed, more deep at the root of the tail, and the middle rays of the tail more lengthened. The colour a pale grey, with separate well-marked spots of yellowish brown on the head, body, and fins. A figure of this fish is given on the next page.

As we have already remarked that there is considerable difficulty in distinguishing some of the species of this genus from others decidedly different, we shall copy from Dr. Gunther's catalogue, as quoted above, some supposed unvarying marks by which each one in doubtful cases may be known:—"In the Rock Goby there are eleven or twelve series of scales between the second dorsal and anal fins; and it is to be observed, as a general rule applicable to all fishes, that although the scales increase in size with the growth of individuals, they are not known to vary in number with difference of age." Professor Nilsson says that in the female the pectoral and ventral fins are shorter than in the male, and the two dorsals further apart.





Figure, shewing the ventral fin.



PAGANELLUS

XCIX

PAGANELLUS.

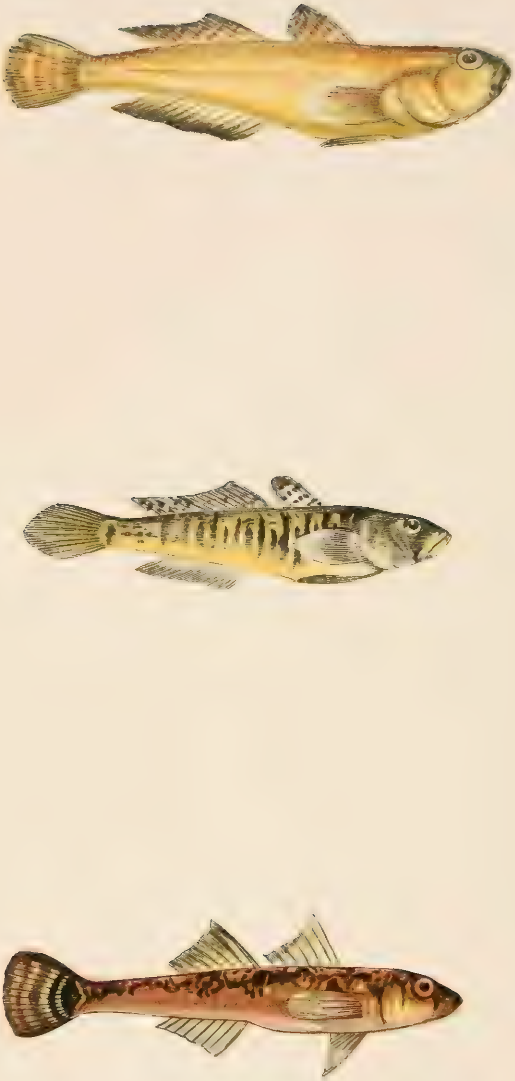
Paganellus,	Willoughby; p. 207, Table N. 12, f. 4.
Paganel,	Lacepede. Risso.
Gobius paganellus,	Linnæus.
" "	Gunther; Cat. Br. M., vol. iii, p. 52.

This species has been generally overlooked in British natural history, or confounded with the Rock Goby, which it resembles so closely that it will be described best by comparing it with that species, and noting the circumstances in which they differ, as is done by Willoughby, in the following particulars:—It seldom grows so large, and its colour is usually more pale, (although we admit that the degree or variation of colour is little to be depended on in the distinction of species in this family. The first dorsal fin is marked along its border with a line of yellow or pink colour. In regard to structure, the furrow in front of the dorsal fins is less deep and not so long; and, what is more observable, the head is something shorter, and the jaws more distended. The membrane which connects together the external rays of the ventral fins does not rise so high; but the distinction advanced the last, where the Paganellus is said to keep in rocky ground, and the first-described species, on the contrary, prefers that which is oozy, seems less appropriate, since some of the examples of the Paganellus which I have seen, and which were obtained from the north shores of Somersetshire, through the kindness of E. T. Higgins, Esq., were procured from a bottom where only sand or ooze was to be found. Whether it will, like the Rock Goby, by choice live in fresh or slightly brackish water, seems less certain; but the extent of its range appears to imply that it is more susceptible to the impression of cold than the Rock Goby; for although it has been found in Scotland and the south of Ireland, as well as in the north of Somersetshire and Cornwall, it is more abundant in the Mediterranean, and even so far south as Madeira.

In addition to the comparative description of this species we have already given, it is to be observed, that in one of two examples sent to me, the rays of the first dorsal fin were of very great length, the fourth of them (which was the longest) extending to the fourth ray of the second dorsal,—a particular which appears to have existed also in the specimen of which a figure is given by Willoughby, as referred to above, but in either case it seems to be of no usual frequency.

The uncertainty or confusion which has existed among eminent naturalists in regard to the Paganellus, is singularly shewn by comparing the description given by Risso, with that which is found in the work of Lacepede, to which the former writer refers without apparent hesitation. Risso describes the tail of this fish as elongated in the middle, while Lacepede is careful to say that it is nearly straight. In our own examples the shape is as represented by Lacepede, or but slightly more round. As a further mark of distinction, Dr. Gunther says there are fifteen or sixteen longitudinal rows of scales between the second dorsal and anal fins.

I have not found an example to exceed about four inches in length. The general proportions much like those of the Rock Goby, but the fins appear more extended, and the pectorals especially longer; the anal not passing so far back as the second dorsal. The scales small, but well marked. General colour dull yellow, mottled with brown, and with brown lines radiating from the eyes, but in this particular liable to variation. First dorsal fin with six rays; the border white, with successive bands of blue and pink. Second dorsal with fifteen rays, with two equal bands of blue and pink. Anal with twelve rays, and, in one example I counted ten; blue, with a white border.



1. YELLOW GOBY.

2. LITTLE GOBY. 3. TWO-SPOTTED GOBY.

C

YELLOW GOBY.

Gobius auratus,	Risso; p. 11, pl. 11, f. 42.
Elotris auratus,	Cuvier.
" "	Gunther; Cat. Br. M., vol. iii, p. 11.

This fish was first mentioned as a separate species by Risso, and hitherto it has been supposed to be confined to the Mediterranean. But although its range in our own country may be limited, there is reason to believe that within certain districts it exists in moderate numbers, for I have received a few examples that closely resemble Risso's figure, and answer to his description, from the neighbourhood of Weston-super-Mare, in Somersetshire, through the kindness of Edmund Thomas Higgins, Esq., by whom these and a few others presently to be described, were procured from the shrimp-nets and crab-pots employed in that neighbourhood. The shores there are lined with sand or soil, to which it is probable these fishes shew a preference: a circumstance which may explain why this and some kindred species have not been seen on shores with which I am best acquainted, where the sea is bounded only by rocks, except where an harbour opens to the ocean. But the individual habits of these fishes are yet to be inquired into.

The length of the largest example was nearly three inches; the fore part of the body stout, more compressed along the sides, slightly tapering near the tail. The head broad, but not nearly so as in the two last-named species, short before the eyes, and blunt. Under jaw a little projecting; angle of the mouth descending. Eyes close to the top of the head, and near each other. Cheeks full. The first dorsal begins at half the length of the pectoral; the rays even with the membrane. The second dorsal only a little separate from the first. Anal beginning opposite the first ray of the second dorsal, and both ending together at a good distance from the tail; the last-named fin round. Pectorals also round, not reaching to the vent. Ventrals united, round, but with a separating line causing them to appear as two, on which account a separate genus, as above, has been created for them. The general colour is a pale yellow, with a pink border to the very small scales. Slight pink bands on the dorsal fins and tail; border of the ventral fins very dark.

I have noted that this species appears to be the most heavy of any Gobies that I have examined, and that there was much difficulty in the attempt to count the number of the rays of the fins. I supposed them to be—the pectoral fourteen, anal twelve, ventral ten, caudal fourteen. According to Risso, the first dorsal is furnished with six rays, which appears to be the usual number in most of the species in this section of the genus; the second has fourteen, pectoral fifteen, anal twelve, caudal fourteen, ventral ten. He says also that the pectoral fins have a brown spot at their base, and a slight mark of this appeared in the example we have described; but in his specific character he speaks of this spot as sky blue, which at least implies a tendency to variation.

LITTLE GOBY.

Little Goby,	DONOVAN; pl. 38.
Gobius minutus,	GUNTHER; Cat. Br. M., vol. iii, p. 58.

I JUDGE that the species now to be described is the same which is termed *Gobius minutus* by the generality of naturalists, and the small size of the one or two that have come under my notice, scarcely reaching two inches in length, will go far to support the propriety of the name. But, on the other hand, there are so many species of this family which are little, if at all of greater bulk, and one or two which are usually found smaller, that the species bearing this name can scarcely be thought well distinguished by the appellation; the more especially as the figure of it given by Donovan, which we may suppose to be of the actual size of the example from which it was drawn, is a little more than three inches in length.

From the accounts I have received it appears to prefer soft, sandy, or oozy ground; and the specimen from which our figure and description are derived was from the bay of Weston, on the Bristol Channel. In shape it comes nearest to that which I have termed the Yellow Goby, but compared with that fish the eyes were a little smaller, and scarcely so near each other. Dorsal fins still closer together; middle rays of the tail more lengthened. The ground colour had a tendency to yellow, but freckled over, and the body was encompassed with seven dark bands, between each pair of which, across the lateral line, a shorter line. A dark line also descends from the eye; and there are spots on the first dorsal, and a dark patch at the root of the tail. Ventral and anal fins dark.

TWO-SPOTTED GOBY.

DOUBLY-SPOTTED GOBY.

Gobius Ruthensparri,	Cuvier.
" *bipunctatus,*	Yarrell; Br. Fishes, vol i, p. 285.
" *Ruthensparri,*	Gunther; Cat. Br. M., vol. iii, p. 76.

There is a little natural section of the family of Gobies, in which the species differ from those we have described, as well in form as habits, but of which the characters have not been marked with the discrimination required to determine the species, and of which therefore more than one or two have been confounded together. These we shall endeavour to distinguish; and, however unwilling to increase the number of synonymous names of fishes which may have been noticed and defined by foreign naturalists in books to which I have not obtained access, I shall be compelled for the sake of perspicuity, to apply to one or two of them names not hitherto in use, but which will be expressive of some individual character or peculiarity.

This small division of the genus is formed of fishes of small size, which on that account receive little notice from fishermen; who are not aware of the fact that they are of value to them so far as that they form the food of species of larger size, which, in pursuit of them, are drawn within the reach of their productive labour. Indeed so small are these Gobies, that for the most part they cannot be preserved in collections in the manner of the greater number of fishes; and, besides the shrinking which they undergo if preserved in spirit, their colours, which are usually of much beauty, will generally be found to vanish if thus treated; which circumstance will serve to explain how it is we meet with such imperfect representations of them in works on the history of nature.

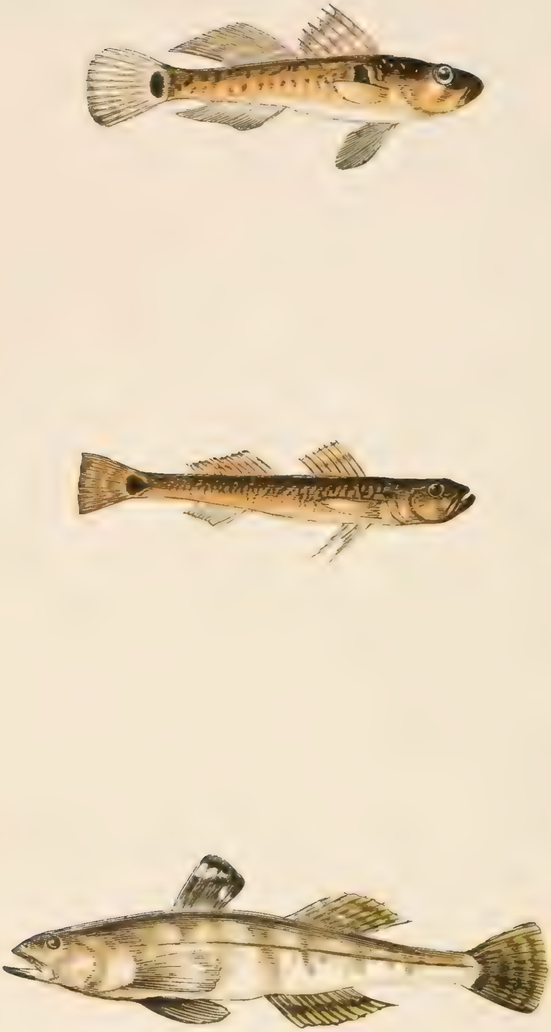
The habits of this limited section of the Gobies are amusing in no slight degree, as we watch them in a summer's day where the sea is unruffled and the tide flowing gently in, while the observer keeps himself still or concealed behind a rock; for as these creatures have reason to fear an enemy on every side, they shew their apprehension of every unusual appearance, by instantly darting into some neighbouring crevice, where they lie hid until the danger is passed.

The two or three species which have been confounded together under one common name, may at this time be seen floating in scattered groups at mid-water, where they appear to enjoy the sunshine, but are ever ready to rush after the minute animals that come within their reach, at the same time keeping careful watch against being themselves the prey of prowling fishes of a larger size. They perhaps may seek concealment also at the bottom or among sand, where the crevice of a rock or stone is not near; and the mottled appearance of their back will tend to aid concealment; but it is not their habit to rest on the ground as those species do which are of a more heavy form. Nor do they commonly pass into a considerable depth of water; and the only exceptions to this remark that I have met with among the smaller Gobies, have been in the instance of one or two presently to be described under the name of Slender Goby, or a kindred species, examples of which were obtained from the depth of about forty fathoms, in the months of December and February.

The Doubly-spotted Goby is found on every part of our coast suited to its habits, as well in England as in Ireland. Nilsson says it is also abundant in the north of Europe, except in the Baltic, where it has not been seen. As there are two species at least which are met with on our coasts that bear the name of Two-spotted Goby, we shall first describe that one which we have represented in our engraving under that name.

It seldom reaches two inches and a half in length; the general shape compressed, and moderately lengthened. Head, before the eyes, short; lower jaw a little protruding. Eyes high on the cheek, near each other, and conspicuous. A slight channel in front of the dorsal fin; these fins close together, and in some examples I find the first ray of the first dorsal the longest, decreasing gradually, in another the second and third ray longer, the rays of these and the anal not bound down, but carrying out the membrane. Second dorsal and anal with the first rays longest, and both these fins equal in length, ending far from the tail. Pectoral fin having rays of nearly equal length, except the two or three lowest rays, which are shorter. Tail slightly round. Ventrals forming a simple oval, with a slight line through the middle.

Colour a lively chesnut brown, mottled on the back with some regularity, sometimes with light specks. At the root of the tail a conspicuous, dark, ocellated spot, and another at the side, covered partly by the pectoral fin. Fins usually pale, but sometimes with longitudinal bars. Iris of the eye commonly red. In one specimen the first ray of the second dorsal fin was shorter than the second, and in another it was longer than all besides; and in this example the second dorsal and anal advanced nearer to the tail than in others. These mark a distinction of species; but in this instance they are pointed out to shew the liability of some kinds of Gobies to sport into varieties.



1. BROAD-FINNED GOBY.

2. TAIL-SPOTTED GOBY. 3. ONE-SPOTTED GOBY.

[illegible]

BROAD-FINNED GOBY.

Gobius biocellatus, C.

This species has much the same habits, and is found in the same places as the last, with which it has been confounded, and to which it bears considerable resemblance. The differences will be found in the following description. It is not quite so long, its greatest length being about two inches; but the fore part of the body is stouter. The eye is large, a little higher on the head, which is flat. Jaws about equal. Scales on the body large for the size of the fish. The dorsal fins are rather closer together; but what is to be particularly noted is the high elevation of the second dorsal fin, and the great length of the hinder rays, which, when laid on the back, overlap the root of the tail. The first ray of the first dorsal highest, seven in all; in the second dorsal twelve, as is also in the anal fin; upper rays of the pectoral longest, supposed eighteen rays; ventrals wide, fan-shaped, with ten rays; tail round, with thirteen rays.

The general colour is brown, with a tinge of pink, speckled along the sides with white tinged with purple. Two ocellated spots, as in the Two-Spotted Goby. Dorsal fins and tail on a ground of pink have lines of faint white which decline as they pass backward. The cheeks yellow; belly white. In one example the anal fin was almost as wide as the second dorsal.

TAIL-SPOTTED GOBY.

Gobius attenuatus, C.

This species is found in the same places with the two last named, to which, chiefly on account of its colour, it bears considerable likeness; but it is much more rare than either of them. The length scarcely exceeds two inches, and the general shape almost uniformly slender from head to tail. The snout is even shorter in front of the eye than either of the others, but the eye is not quite so high. Under jaw protruded. The dorsal fins are further apart; second dorsal and anal low, and the latter begins opposite about one third the length of the former, both ending together. Tail straight. In the example described the ventral fin was divided, but this may have been produced by accident.

The colour was uniform chesnut brown, lighter on the belly; dorsal fins and tail with reddish bars; anal fin pale; a dark ocellated spot at the root of the tail, but no mark or stain of this sort on the side, as in the other tail-marked species.

ONE-SPOTTED GOBY.

Gobius unipunctatus, YARRELL; Br. Fishes, vol. i, p. 292.

I HAVE not met with this species on the rocky coast with which I am best acquainted, but examples have been obtained from Weston-super-Mare, on the Bristol Channel, by E. T. Higgins, Esq., and kindly sent for my use. It was first made known by Dr. Parnell, who procured it on the coast of Scotland, in the shallow water of sandy bays; but beyond this little seems to be known of its peculiar habits, except perhaps a circumstance that will be mentioned presently, if the species should chance to be the same.

The example described measured two inches and seven eighths in length; the shape not greatly compressed, deepest at the first dorsal fin, and from thence becoming more slender to the tail. Eyes of moderate size, high on the cheek, near each other, but not in contact. The snout not sloping so much to the mouth as in the three last-mentioned species. Under jaw longest; teeth conspicuous. Scales on the body distinctly seen. The first dorsal fin rises at about half the length of the pectoral, the rays elevated, and the membrane passing far back beyond the last ray. Pectoral ending opposite the last ray of the first dorsal, upper rays shortest. The two dorsals widely apart; the first ray of the anal slightly in advance of the second dorsal, and the two ending opposite each other at a considerable distance from the tail; the latter fin but slightly rounded; the ventral fins reach to the vent.

The colour is a pale brown along the back, from which in one example proceeded several bands of a fainter colour; the fins also were of the general colour of the body, and on the second dorsal, anal, and caudal fins were three or four darker bands or stripes. But the distinguishing mark which has been assigned to this fish is found on the first dorsal fin, and which is described as a black spot, of a constant character, between the fifth and sixth rays. Our representation will shew, however, that this spot, if so it may be termed, by no means invariably answers to the description given of it. In one example it occupied, in a triangular form, more than half of the anterior portion of the upper border of the fin, and also more widely the posterior border; but below the first portion it was bordered with a white stripe that was directed obliquely upward, and the second portion was bordered with a bent line below, and both these white marks were succeeded below by a darker tint. In another specimen the anterior portion of this black mark was narrower, but bordered above by a white edge to the fin. The lowest portion of the fin in this instance was decidedly dark.

Naturalists are not agreed whether the species termed the Spotted Goby *(Gobius minutus,)* be or be not a younger condition or variety of the One-Spotted Goby. It was the opinion of Dr. Parnell that he had proved them to be different, while the decision of Dr. Gunther is to the contrary; and it must be confessed that I have not been able to discover any difference between them, except in the size of the fishes and the presence or absence of the spots that ornament the first dorsal fin. The question therefore is left undecided, and we content ourselves with extracts from the authors already quoted. Dr. Parnell, as referred to by Mr. Yarrell, says:—"This fish, although closely allied to the other species of the same genus, is undoubtedly quite distinct from them, the black spot on the first dorsal fin being far more constant and conspicuous than any character which distinguishes the rest of the British Gobies. The only species it can well be mistaken for is the *G. minutus,* but differs from it in having a black spot between the fifth and sixth rays of the first dorsal fin, the second dorsal with eleven rays, and the tail fin even at the extremity. Whereas the *G. minutus* has no black spot between the fifth and sixth rays of the first dorsal fin; the rays of the second dorsal ten in number, and the tail fin rounded at the end." On these points Dr. Gunther's observation is, that Parnell's assertion "that specimens with a spot on the first dorsal fin have two rays more in the anal than those without a spot, is not confirmed by my examination of numerous specimens."

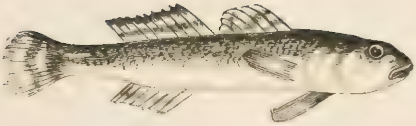
In the first dorsal fin of the example we have given a figure of there were six rays, in the second dorsal ten rays, the last being double. The anal fin with eleven rays; the tail with sixteen; ventral having sixteen, of which some were very short.

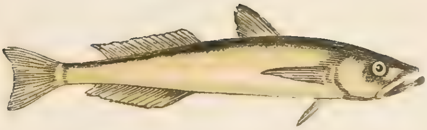
SPECKLED GOBY.

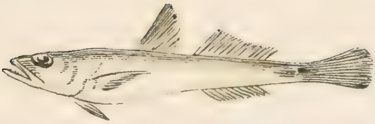
Gobius rhodopterus,	Gunther; Cat. Br. Museum, vol. iii, p. 16, quoting Mc Coy, in Annals and Magazine of Natural History, vol. vi, p. 403.
" *reticulatus,*	Cuvier.

The species named as above is known in the Mediterranean, and was discovered by Professor Mc Coy, in Dublin Bay; but I am only able to express the supposition that it is the same with a fish supplied to me from the north coast of Somersetshire by E. T. Higgins, Esq., where, with others we have occasion to mention, it was taken in a net of shrimps.

This example was a little beyond two inches in length; the head short before the eyes, which are high on the head, but not close together; lower jaw a little the longest. Body wide behind the head, compressed posteriorly. The first dorsal fin begins over the first third of the pectoral, and Dr. Gunther says of this species the second ray is the longest: to me it appeared that the first four of the six were nearly of equal length, but their bent position gave the appearance as if the outline formed a circle; not so high as the second dorsal, which begins near the first and ends at a good distance from the tail. Anal fin shorter than the second dorsal, but they end opposite each other. Pectorals of moderate size; ventrals close under the throat. The general colour grey, with bars on the dorsal fins and tail; the last-named fin round.







1. [illegible] GOBY.

TRANSPARENT GOBY. SLENDER GOBY.

CII

TRANSPARENT GOBY.

Gobius pellucidus, C.

The fish of which a figure and description are now given, under a name new to science, was procured from the Bristol Channel, by the kindness of E. T. Higgins, Esq.; and in several particulars it differs so considerably from every species to which I am able to refer, as known hitherto on the British coasts, that I feel compelled to regard it as new.

Two examples in my possession were of about equal size, and when first caught they were even more than semitransparent. Mr. Higgins remarked that they might be compared to the Morris in this respect; but their size, which measured an inch and three fourths in length, will not countenance the supposition that this transparency can be accounted for by the early condition of their growth. The snout is of greater length than in most of the species of Gobies that have come under our notice, and consequently protrudes further before the eyes; under jaw longest, and the gape wide, running back under the eye. The body slender, of uniform breadth, beginning to slope only near the tail. First ray of the first dorsal over half the length of the pectorals; length of the rays decreasing rapidly. Second dorsal not near the first, low, parallel with the anal; pectoral fins slender, long, ending in a point; ventrals slight; tail a little concave. No visible scales. No spot nor bar on any of the fins, except that in one example there was a slight dusky mark at the root of the tail. Colour simply pale. Viewed from below the borders of the gill-covers appeared to close one over the other.

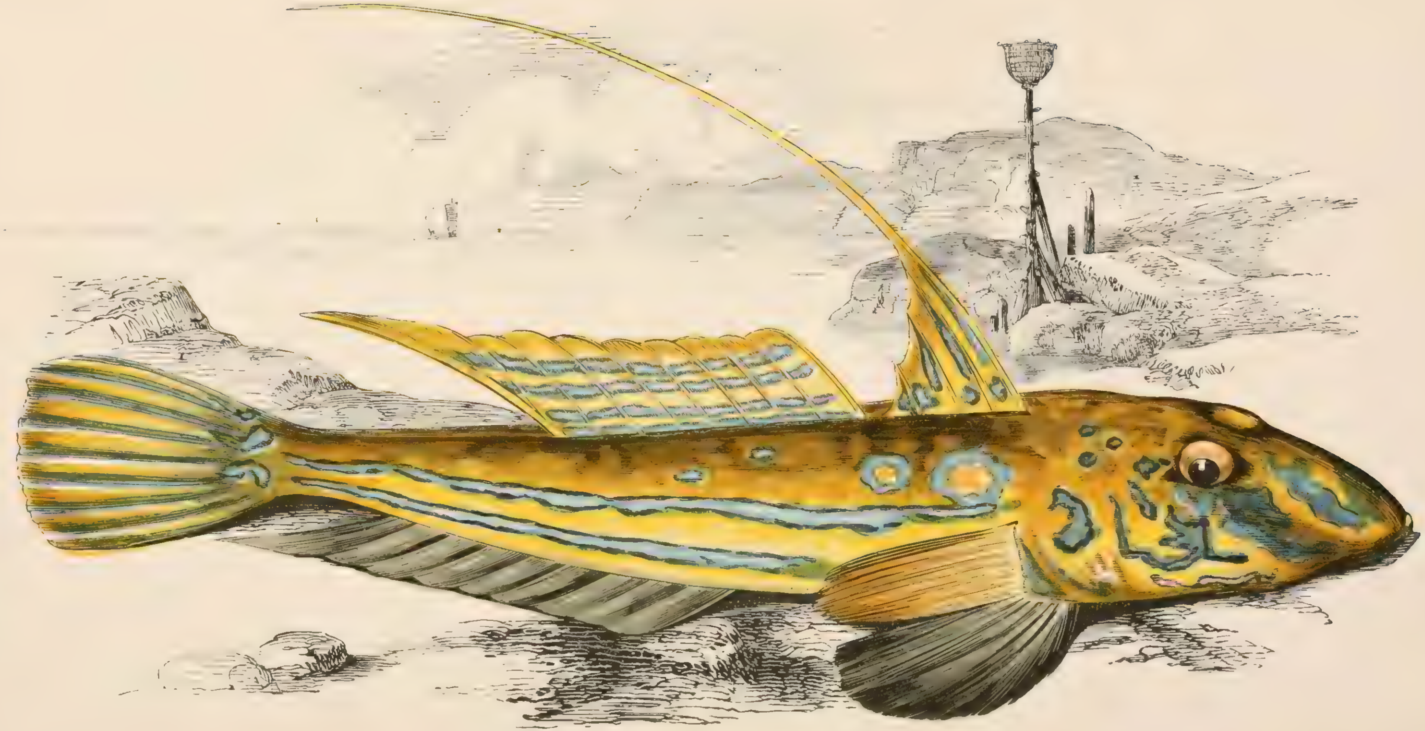
SLENDER GOBY.

Gobius gracilis, C.

If we may judge from the discrepencies that are seen in the descriptions of a species under the name of the Slender Goby, and the disagreement between the description and the figure in a popular and generally excellent work, we cannot avoid the conclusion that more than one, or even than two kinds of Gobies have been confounded together under this name. It appears useless to attempt to decide in this case, as to the question which of these authorities is to be followed, and therefore under this title we give a figure and description of a fish which, from its form and proportions, seems well entitled to bear the designation. The difference from those which we have already represented will scarcely be disputed; but of its distinguishing habits we are not able to say more than that it was taken, with others of the same genus, near the shore in the bay of Weston-super-Mare, in Somersetshire.

It measured an inch and a half in length; the greatest depth at about the root of the pectoral fin, from whence it sloped gently to the snout; and from the first dorsal fin becoming more slender posteriorly, but most so behind the vent. Lower jaw a little the longest; the gape a little oblique. Eyes conspicuous, high on the cheeks. Dorsal fins widely apart; the rays of the first of equal length; anal fin shorter than the second dorsal, but ending together. Tail with the middle rays lengthened, and consequently almost lancet-shaped. Colour dark, especially on the back; sides and belly pale yellow, with dark spots, which are largest along the lateral line.

The White Goby of Dr. Parnell has fallen under my notice in Cornwall, but, from its very minute size and diaphanous appearance, I regard it as the young of some better-known species. It is the *Gobius albus* of Yarrell's "British Fishes," vol. i, p. 295; *Latrunculus albus,* Gunther's "Catalogue of British Museum," vol. iii, p. 80.



YELLOW SKULPIN.

CIII

CALLIONYMUS.

The head oblong, depressed; eyes on the top of the head, and near each other; the intermaxillary portion of the jaw capable of protrusion. Gill opening very small, high on the body; hinder gill-covers armed with a spine. Ventral fins larger than the pectorals, and placed under the throat, which places them in the order of jugular fishes as arranged by Linnæus. Dorsal fins two.

It has long been believed that there were two fishes of this genus which were natives of the coasts of the British Islands; and the general proportions of their shape, the very different dimensions and form of their organs of swimming, with great diversity of colour, appear sufficient grounds for this supposition; but it is an extraordinary circumstance in connection with the history of these fishes, that in recent times a doubt has been thrown on the fact of their being of distinct species; and it has become the belief of some naturalists that the two supposed British kinds of *Callionymus* are, in reality, only separate sexes of the same fish. In proof of this opinion it is argued that no decided instance has been met with in which roe has been detected in the species known as the Yellow or Golden Skulpin, *(Callionymus lyra;)* whereas in all cases the less developed, and more soberly-ornamented Plain Skulpin, or, as it has been called, the Sordid Dragonet, is found to be a female, or, if a male, the latter is in its earliest and less-developed stage of existence. Where this diversity of opinion exists, it remains for further observation to decide the question; but, in the meanwhile, as their appearance is very different, and some difference also is believed to exist in their habits, we deem it proper to proceed on the old opinion, and describe them as if they were truly separate species.

These fishes are without an air-bladder.

YELLOW SKULPIN.

GOLDEN SKULPIN. YELLOW GURNARD. GEMMEOUS DRAGONET.
GOWDIE.

Callionymus lyra,	Linnæus. Cuvier.
Callionyme lyre,	Lacepede. Risso.
Callionymus lyra,	Donovan; pl. 9. Fleming.
" "	Jenyns; Manual, p. 388.
" "	Yarrell; Br. Fishes, vol. i, p. 297.
" "	Gunther; Cat. Br. M., vol. iii, p. 139.

This fish is common in the Mediterranean, and must therefore have been known to the ancients, but from their want of precision on subjects of natural history, it is not easy to pronounce whether it be the same with the species known to them by the name of *Callionymus,* which is the term adopted by Linnæus as the designation of the genus in which the Yellow Skulpin is arranged. Some fish which bore this name is referred to by the Greek comic poet Aristophanes, as sufficiently known for popular allusion by the supposed property of possessing a large abundance of gall. It is also mentioned by Aristotle, and in later times by Ælian. Pliny further tells us that with the Romans, in addition to the name of *Callionymus,* it was known as the *Uranoscopus,* or Sky-gazer, because its eyes were on the top of the head, with their vision directed upward. This latter circumstance, in connection with the former name, which recognises the beauty of its appearance, may be supposed to point to the Yellow Skulpin, which answers to both these particulars; but if any doubt remains concerning it, we are not able to mention any other author of a remote date who has given an account by which it can be more definitely determined.

Of the earlier writers of modern times we find that Jonston and Willoughby have copied into their works (from Rondeletius) the figures of a species which may have been intended for the Yellow Skulpin; but these representations cannot be quoted as a fair representation of the fish, since they shew the lengthened rays of the first dorsal fin as of equal extent; and it was only so late as about the middle of the seventeenth century that Dr. Tyson was able to remove the doubts concerning it as a species, and to shew that it was to be found also in Britain. And with us it is far from uncommon, although the habits of naturalists, rather than of the fish, have caused it to be regarded as rare.

Willoughby and his friend Ray were accustomed to visit the markets in places they visited, for the purpose of obtaining examples of such fishes as were brought thither for sale; but it must happen that there are many sorts (as in our own country the Yellow Skulpin) which are not of sufficient value to be thus dealt with. Nor does the species now referred to frequently take a bait, which, however, is not caused by any peculiar manner of feeding, but it proceeds from the fact that at the depth of water in which it usually keeps, the hooks employed by fishermen are too large for its mouth. It is more likely to be dragged from the bottom by a trawl, and it is not unfrequently found in the stomachs of the larger fishes that take their prey from the ground, which is its appropriate resting-place, and on which its flattened shape enables it to recline with ease. In this situation also the size and position of its ventral fins afford it support, while, by a very slight motion in them, it is able to raise itself in an instant for escape, or to seize any object it wishes to devour. The food is laid hold of by a thrusting forward of the upper jaw, the intermaxillary bone of which is capable of being protruded through a portion of a circle, and thus of grasping an object from below as well as from above, for the lower jaw as well as the upper has an extensive motion. It is probable that the balancing power of the extended rays of the first dorsal fin may be of service in the sudden and rapid actions of the fish when it rises from or descends to its place of rest at the bottom.

The Yellow Skulpin is known through the extent of all the coasts of the British Islands, at least as far as the Orkneys; and it is also found along the coasts of the North Sea and the Cattegat, but it is not met with in the Baltic. It does not appear to be in the habit of congregating into companies, and seldom comes very near to the land; but it prefers to remain at the depth of from twenty to sixty fathoms, at least on the western borders of the kingdom. It is observed that it does not die speedily when taken from the water, which probably arises from the remarkable construction of its gills, through which the stream can only find a passage through an opening of small size, the direction of which is well fitted to a creature which rests habitually on the ground, and the breathing of which would be with difficulty if the aperture were open only on the under side.

The example selected for description measured in length ten inches and a half, and an inch and three fourths across where widest, which was above the gills; head depressed, becoming narrower and rounded to the upper lip, which protrudes beyond the lower jaw, which is narrow; the teeth fine and numerous. Eyes on the top of the head, near each other; the vision lateral, but on dissection the muscles of the eyes are seen to be so placed as to roll the ball upwards, but not downward. The tongue thin and free. Gill membrane fastened down except at a small orifice behind the eye; on the margin of the anterior border of the gill-cover is a strong flattened spine, having three points directed obliquely upward. The body is narrower than the head, depressed, and channeled, but round at the sides, becoming slender towards the tail. Dorsal fins two, the first ray of the first being so long as to overlap the tail, slender, and (in the example described) five inches and a half long; the rays, four in number, decreasing in length in regular progression, on which account Lacepede launches out into a fanciful analogy between them and the cords of the lyre, from which the fish has obtained its trivial name. The second dorsal is broad, but does not approach the tail, its ten rays rising above the fin, but bound down on its border, the two last bound together, and longer than the others. The anal fin answers to the second dorsal in the number and nature of the rays, but is placed nearer the tail; the latter organ rounded, with nine divided rays projecting beyond the membrane. A process in front of the anal fin. Pectorals with nineteen rays; those of the ventrals five, fan-shaped.

Lateral line begins high on the back, irregular at first, and then straight; when dry this line appears like a fine cord, and along its course at regular distances are short threads proceeding obliquely backward, appearing the discharging ducts of mucous glands. The colours are beautiful, but subject to some variety: top of the head and along the back dusky yellow; light golden yellow on the cheeks and sides, with two regular stripes and some spots of azure; an ocellate spot near the beginning of the lateral line, the centre yellowish brown, the circle a fine blue. Dorsal fins golden yellow; on the first dorsal stripes of azure run in the direction of the rays; at the bottom a line ranges along parallel with the back. On the second dorsal four longitudinal azure lines; tail with irregular lines of the same. Pectorals yellow; ventrals dark, in some examples with stripes of yellow and blue. The ventral is united by a membrane to the pectoral. Belly white; the thorax black.

There is a variety of this fish which differs sufficiently to require a separate notice.—It is of less frequent occurrence than that which we have described, but is represented by the figure in Mr. Yarrell's second edition, as already referred to. The membrane of the first dorsal fin much wider than usual, and reaching to near the extremity of the longest ray.

As bearing on the question of the sexes of this species I quote the following note from an examination of two examples, one of which possessed the usual marks of the male; but the other displayed those characters which by the Prince of Musignano are ascribed to the female. The mouth was more slightly formed, and had a less extensive gape; and the lengthened ray of the first dorsal reached no further back than to the end of the third ray of the second dorsal. The colour of both examples was the same. We shall say more on this subject when we describe the Dusky Skulpin.

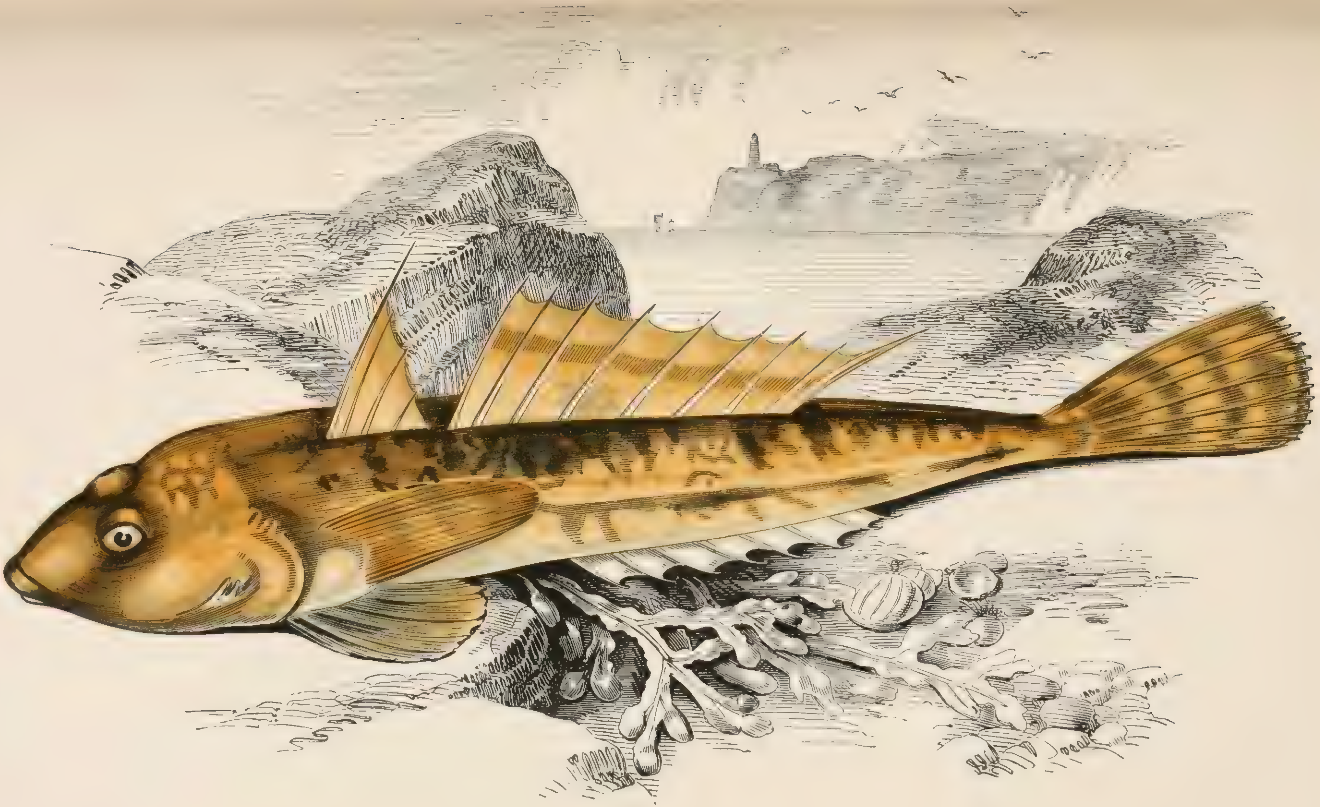
DUSKY SKULPIN.

SORDID DRAGONET. COMMON SKULPIN. FOX, perhaps from the colour it sometimes assumes, as represented in Bloch's unsatisfactory figure. But this fox-like tinge is only seen in particular situations.

Callionymus dracunculus,	LINNÆUS. CUVIER.
Callionyme dragonneau,	LACEPEDE. RISSO.
" "	DONOVAN, pl. 84.
Callionymus dracunculus,	JENYNS; Manual, p. 389.
" "	YARRELL; Br. Fishes, vol. i, p. 302.
" "	GUNTHER; Cat. Br. M., vol. iii, p. 139.

THIS species, if it be a species, and not merely the female or undeveloped male of the fish last mentioned, is perhaps more abundant than the Yellow Skulpin, as indeed would necessarily be the case if it includes a large portion of the two sexes; but this circumstance may also be explained by its being more frequently found in sandy bays and shallow water, where its presence and motions can be more readily observed. It may there be seen at rest on the ground, where, however, its mottled colours serve in a great degree to conceal it, although not with such certainty as to prevent it from being often the prey of the larger and more voracious fishes, to escape from which it would appear from an observation of Dr. Ball, in Ireland, that it is capable of burying itself in the sand. But it is also common in deep water, where we know it chiefly from its capture in trawls, or from the stomachs of fishes which take their food from the bottom. Its own food is worms, small shellfish, and other sorts of molluscous animals.

We can believe the assertion of Lacepede, that both these



DUSKY SKULPIN.

CIV

kinds of Skulpin afford good food, but they find no place at British tables.

The Dusky Skulpin is known on every part of the coasts of the British Islands, as also in the North Sea and Mediterranean.

I have known this fish to measure nine inches in length, but usually it is not so large. The general proportions as in the Yellow Skulpin, except that the head in front of the eyes is not so long. The most remarkable difference, however, is to be found in the comparative length of the rays of the dorsal fins, and in the colours, which, in the Dusky Skulpin, however prone to vary, are never like those of the Yellow Skulpin, either in tints or arrangement. Sometimes the prevailing colour is olive green, sometimes brown, dark, or light copper, with mottlings which occasionally assume the form of bars or bands across the back; and an example has been seen from the deeper water at the mouth of the British Channel, in which the upper surface of the body was covered with beautiful ocellated spots, the second dorsal having also a broad line of the prevailing colour of the body. But in no instance has there been observed a tendency to the resplendent blue which adorns the sides, cheeks, and fins of the Yellow Skulpin. But the more remarkable dissimilarity is found in the extent of the rays in the first dorsal fin, the first and longest of which does but little exceed, if at all, those of the second dorsal. It is common also for this first ray to be bound down on the fin, as if incapable of becoming of longer growth. This, however, may be the character of the female only, as is the undoubting belief of some naturalists; and in justice to the subject, it must be noticed that instances occur in which individuals may be supposed to be in the condition of passing from the partially developed to the perfect state, or from that of the undeveloped male, resembling a female, to the state in which the male characters are fully represented.

The earliest manifestation of this asserted development is seen in a lengthening of the first ray of the first dorsal fin, to the extent of a fifth part of its ordinary length, as measured in the Dusky Skulpin. But in another example, which had attained the length of seven inches and a fourth, this first ray was so much elongated as to reach backward more than half the length of the second dorsal, its extent being two inches, while in another fish of the same size it measured only about half an inch. The snout in front of the eyes in this example with the partially lengthened fin, has also assumed the protruded form of the acknowledged Yellow Skulpin. The difference in colour was only that this example was pale, without the dark tinge on the throat which is seen in the fully-coloured Yellow Skulpin; while several specimens of the Dusky Skulpin, with short dorsal rays, laid by its side, had their colours, as described above, strongly marked. In the month of December none of these fishes contained evidence of roe or milt. The number of rays in the fins of both these fishes is the same.

SUCKING FISHES.

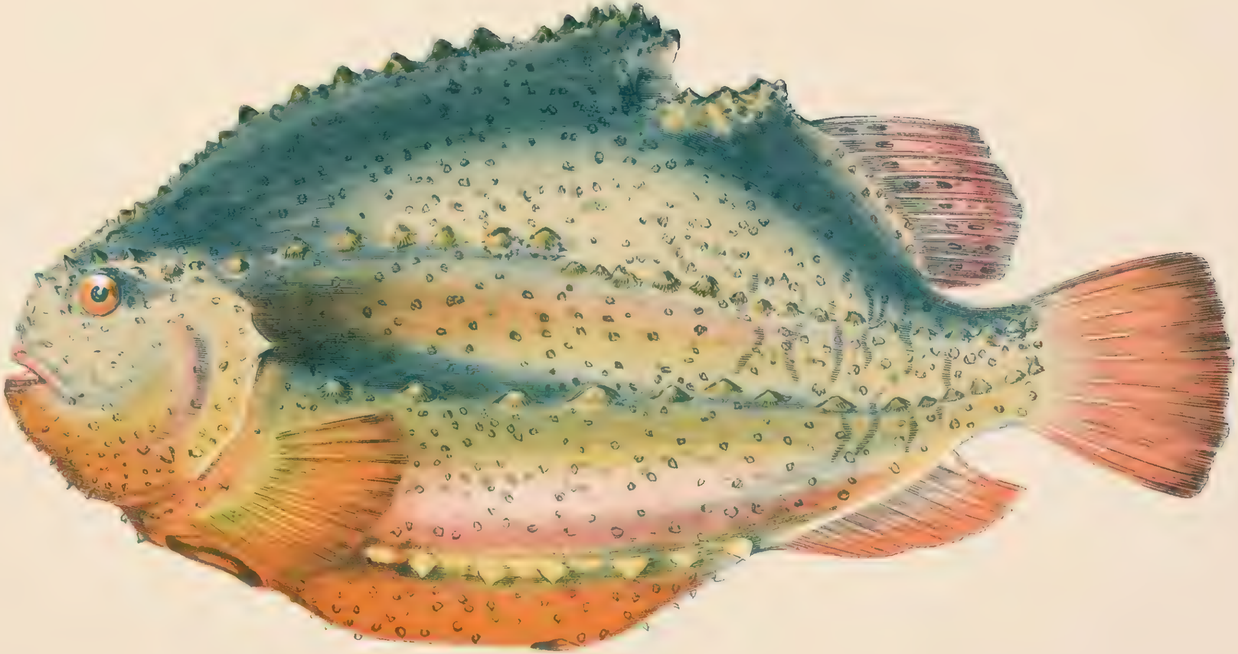
(*Discobuli* of Gouan.)

This small family of fishes is distinguished by the remarkable character of possessing an organized disk below the throat, where it is encircled with a narrow border of fin, which forms an union also with the pectoral fins. The office of this disk is to enable the fish to fasten itself to any fixed object, in a manner which bears some degree of likeness to that by which the Remora attaches itself to the body of some larger species; and the difference in this respect in the last-named family chiefly lies in the position of the organ, which, as we have seen, is on the top of the head.

This family of sucking fishes does not appear to have been known to the ancients, but we learn from Griffith's translation of Cuvier's "Animal Kingdom," that a Greek writer of the seventh century, A.D., has mentioned them, although, judging by their habit of adhering to other substances, he regarded them as belonging to the same class as the Remora. He terms the fish mentioned by him Naucrates, which is the name applied by others to the true Remora; but he says the organ was on the middle of the breast, and that it resembled the musical instrument, a cymbal. These fishes were little known also to naturalists of the middle ages, whose notice of the larger species, our Common Lumpfish, appears to have been limited to the circumstances of its curious shape being turned into distortion, for the purpose of its being displayed to the wondering crowd, among a variety of other "ill-shaped fishes."

Jonston gives us a figure of this species of the natural form, as well as of that which had been thus distorted; but our earliest knowledge of the peculiarity of this best known of the class is owing to Willughby, who has engraved a competent likeness of the Large Lumpfish, and who also mentions a smaller species under the name of Liparis. This last-named species was placed by Artedi in a separate genus, and in this he was followed by Gouan, Cuvier, and the generality of modern naturalists; but so imperfectly was Linnæus acquainted with these fishes, that, although they are known on the coast of Sweden, where Nilsson enumerates five kinds, he hesitated in defining them. The genus *Cyclopterus,* as arranged by him in his tenth edition, contains only one European species, of which he seems only to have felt assured on the authority of Willughby; but he makes no mention of Liparis, either as a species or genus.

This family of sucking fishes has been called *Discoboles,* from the circumstance that they bear their circular disk on the throat; where it is formed of a border of flattened tubercles round a somewhat level middle portion, which is capable of expelling the water that might lie interposed between itself and the substance on which it seeks to fix itself, and then of exhausting all the influence that might prevent the closest adhesion. We shall have occasion to mention the strength by which this adhesion is accomplished when we speak of the separate fishes of this family.



LUMPFISH.

CV

CYCLOPTERUS.

The head is blunt; eyes lateral; gill-openings small, and closed below. Body without scales. Pectoral fins continued to the ventrals, the latter encircling a disk, which is organized in such a manner as to enable these fishes to adhere firmly to a solid substance. Body thick and solid, with a fatty ridge on the top of the back.

LUMPFISH.

LUMPSUCKER. SEA OWL. PADDLE. COCKPADDLE.

Lampus Anglorum, Piscis globosus,	Jonston; table 13, f. 1 and 2.
“ “ “ “	Willughby; p. 208, table N. 11.
Cyclopterus lumpus,	Linnæus.
“ “	Cuvier. Bloch, pl. 90.
“ “	Donovan, pl. 10.
Cycloptere lompe,	Lacepede.
Cyclopterus lumpus,	Fleming; Br. Animals, p. 190.
“ “	Jenyns; Manual, p. 471.
“ “	Yarrell; Br. F., vol. ii, p. 365.
“ “	Gunther; Cat. Br. Museum, vol. iii, p. 155.

This fish is common along the coasts of the British Islands, and becomes still more numerous as we proceed northward, even to the Island of Greenland, as well as in the Baltic. It is also known on the northern parts of America, but is not enumerated by Risso among the fishes of the Mediterranean. As food it seems not to be thought of in England, the taste being mawkish and unsubstantial, the flesh dissolving in the mouth like mucilage or oil. Yet the Lumpfish was thought of some value as a delicacy, even in England, in times not very distant. Hollinshed says:—“Lumps are uglie fish to sight, and yet very delicate in eating if it be kindlie dressed.” But in the colder regions of the Northern Ocean, and especially in

Greenland, this fish is an object of attention, and is sought for with nets and long lines, the flesh being used either fresh or salted and dried, and in the latter case it is even prepared for exportation. Crantz informs us, however, that even in Greenland it is not relished by every stomach. The roe is more esteemed, and, when salted, is made into a sort of caviar, and even exported as such.

With us the Lumpfish is noticed rather for its grotesque shape than for any remarkable properties which are supposed to belong to it; and yet its history possesses no small degree of interest in the view of those who feel pleasure in tracing the wisdom whereby the structure of an animal is made to exert its influence on its habits, or the latter are confirmed to the former; as also in observing that combination of properties by which some apparent defect is converted into a benefit, or becomes balanced by organizations and instincts which afford to their possessor some unexpected compensation.

Unwieldy heaviness of form must necessarily prove an obstacle to activity of motion, and thus it happens that the Lumpfish becomes liable to the assaults of many formidable enemies; and also, from the same cause, when the sea is lashed into fury it possesses little active power to keep itself from being dashed against the rocks. This last-named danger, however, is provided against by the possession of that peculiar organization on the under part of its body, from which the genus, and this species especially, derive their characteristic name. But to escape the depredations of its enemies is a greater difficulty than to obtain safety from the storm, although the rough tuberculated nature of its covering might seem to offer it sufficient security. The Seal is one of the most formidable of its enemies; and, with all the eagerness of appetite, this creature displays also a high amount of skill in ridding the fish of its skin before it proceeds to swallow the delicious morsel. A particular account of the process by which the flaying is accomplished is given in the "Zoologist" for the year 1851, by Mr. Harris, of Gamrie, although not in all its details, for the first time, as that gentleman supposed. He remarks that this covering is frequently floated in and deposited on the shore by the tide, and, as usually seen, with the head and tail attached to it; sometimes, however, the head is wanting. Judging from a variety of specimens, the operation is commenced on the shoulder and carried downward to the tail, which is regularly chopped off, and dismissed with the skin. On his attention being first called to this fact, he thought it possible that the cast-off skin might be accounted for on the assumption that the Seal effected his repast by excavating the flesh out of the skin; but all the fishermen decidedly affirm that he flays—or, as one of them quaintly expressed it,—he peels them like a potatoe. Sharks fed on them also, and in our western seas an example has been taken from the stomach of a Skate.

With us this fish does not often take a bait, but crustacean animals (*Onisci*) have been found in their stomachs; and, from the great length of the entrails, it may be judged that a portion of its subsistence at least is derived from sea vegetables, for it is a law of nature to which hitherto no exception is known, that creatures, whether of the land or sea, which feed on the productions of the vegetable kingdom, are supplied with entrails far more capacious than such as subsist on animal tissues alone. In a Lumpfish of the length of ten inches, the intestinal canal measured eleven feet, and the capacity was further increased by several blind appendages, termed cæca, which are organs of peculiar use, and, among their other functions, serve materially to increase the functional power of the intestines. It is probable also that the Lumpfish pursues some other prey, which is to be obtained only at a higher elevation in the water; for it is sometimes caught in bag-nets set for Salmon, and in drift-nets shot in the fishery for Mackarel. When thus exerting itself, it may be for rest only that it sometimes resorts to the same contrivance as the Remora; for I have been credibly informed of an instance in which a small example was found adhering to the skin of a Mackarel that had become entangled in a drift-net over a considerable depth of water.

These fishes are most frequently taken in the spring, when they come to the nearer neighbourhood of the land for the purpose of depositing their spawn; and at this time it happens, whether by accident or otherwise, that many more females are caught than males. The roe is produced in very large quantities, so that in the month of April I have found it occupying the larger portion of the cavity of the body; and the grains were of a beautiful pink colour, lying apparently loose in the bag of the ovarium, as not attached to its sides, and only slightly to each other by means of a very fine filmy thread. Mr. Thompson informs us that in a fish fifteen inches long he found twenty-five ounces of roe, of which he weighed a drachm, and from this quantity calculated that the number of the whole was very nearly a hundred and two thousand grains. In another instance we are told that what was collected after they were shed in a prepared place of deposit, amounted by measure to seven quarts; but it is obvious that this large quantity must have greatly exceeded the ordinary bulk of the parent fish; and yet we must not conclude that it was produced by more than one female, but rather that after exclusion the grains had swollen greatly by the absorption of water, as is known to be the case with the frog and other creatures which shed their spawn in watery places. It seems certain that a cavity is formed, which has been termed a nest, for the reception of this treasure, and it is not improbable that the sucking organ is of some service in this important operation. But in addition to the instinctive intelligence which this implies, a high degree of conscious feeling has also been ascribed to both the parents, in which, indeed, the male is said to exceed the female.

The French naturalist Lacepede refers in a florid manner to this supposed trait of character, in a class of animals which generally have been judged greatly deficient in this particular; and which in the Lumpfish is said to be not only shewn in providing a nest, but in carefully watching over the development of the young, as well after as before their escape from the egg, so as not to suffer an enemy to molest them. A similar tenderness has been said to exist also between the parents themselves, whose attachment to each other is thought as lasting as their lives, if, indeed, any human being can be supposed to have had an opportunity of witnessing the continuance of such an union. And yet the whole of this is not romance; for besides the formation of what may be termed a nest, which is placed not far from low-water mark, and in which they are more than imitated by several other fishes; both the parents have been seen to manifest considerable anxiety when watched and disturbed during the continuance of the proceeding, and the male has been known to flit hither and thither, without being able to leave the spot. But the further supposition, referred to by Lacepede, of the continuance of this watchful care until and after the appearance of the young ones, by remaining near them, may receive an explanation which would lead to a different conclusion. The Lumpfish is slow to move at any time, and there are few fishes which are not particularly inert when the proceeding of shedding their spawn has been accomplished. It is easy to suppose, therefore, that when thus exhaustd with lassitude and fatigue, the sucking organ would be put into action for support, and not again be soon disengaged. Such will probably be the case with both the parents; or different individuals of the same sex may become settled down without motion near each other, without being influenced to this by the amicable feelings which have been imputed to them.

It seems probable that the time of depositing the spawn is not always the same; for although the young for the most part appear early in summer, I have known them of very small size in the month of September. Their escape from the egg is speedy, and when of early growth they are found in crab-pots that have been set in favourable situations at the depth of six or eight fathoms. The opportunities which thus offer themselves are so far of interest that they have afforded the means of observing the remarkable changes the young pass through in the early stages of their growth; in which they undergo such transformations as may with some propriety be termed a series of metamorphoses.

Thus in an example of minute size, not exceeding three lines in length, the general shape conveyed the impression of some resemblance to the tadpole of the frog, although with a deeper form of head, and bearing a different colour. The head itself and anterior portion of the body were elevated, solid, wide, and rounded; the forehead perpendicular from the jaws, which are equal; mouth with a moderate gape. Back flat, slightly rounded, where in the full-grown Lumpfish it is ridged. From the vent backward slender, compressed, longer to the caudal fin than from the vent forward. Dorsal fins two, the first narrow and elevated, the second and anal fin long, narrow, united to the tail; the latter round; through the transparent flesh the lines of the vertebræ were seen carried upward along the border of the tail for two thirds of its length, thus in some degree imitating the permanent organization of that part in Sharks and Sturgeons, as also in several races of fishes in extinct and fossilized families, as well as, in a less degree, the Common Salmon. The rays of the caudal fin are seen to proceed downward from this line of vertebræ through the membrane of the tail. The sucking organ under the throat was simple. Colour a yellowish brown, with a bright silver line from near the front, at the lips, through the eyes, and backward opposite the first dorsal fin. A line of the same kind ran across to join the former from before each eye. A little before the caudal fin on the middle line of the body, above and below, was a pale spot, appearing like a mucous orifice; but there was no appearance of a tubercle, and the skin seemed to be furnished with punctations. Professor Nilsson has observed a process of development similar to this, and which he has described in his "Scandinavisk Fauna."

When grown to near an inch or perhaps more in length, I have found it still without a ridge on the back, or a tubercle on the skin; and the tail was even lancet-shaped, but the head had become more massy; and in assuming the finally characteristic form the alteration appears to proceed from before backward. It is at this time also, or often when the length does not exceed half an inch, that the tubercles begin to appear, which is first on the anterior portion of the body, along the line above the pectoral fin, and below it from the sucking organ, but particularly also along the ridge of the back to the first dorsal fin. This then becomes raised and thrust backward, until the fin itself has become swallowed up in the fat integument, and the whole fish assumes the form as we shall now proceed to describe it.

A full-grown Lumpfish has measured twenty-one inches in length, and eleven inches and a half in depth; the head broad, ascending from the mouth in a slightly curved outline to what has been the first dorsal fin, and which continues to be such in the male, which is considerably less than the female. The body is thick and solid, becoming thin and ridged at the back, along which runs a row of elevated rough tubercles, as far as opposite the vent, and close behind this it sinks abruptly to a flat space that is enclosed behind, between it and the second dorsal, with part of a circle of tubercles. The under jaw may be said to protrude a little; lips full; teeth small; nostrils tubular. Eyes elevated and prominent. The body slopes down towards the tail, which organ is a little rounded, but sometimes straight. There are three rows of tubercles on each side, besides the ridge of them along the back. One of these begins a little above the nostrils, runs in a curved shape above the eye, and behind the head it runs with larger tubercles to the origin of the tail. Another begins a little above the root of the pectoral fin, and ends also at the tail; the lowermost begins near the sucking organ and ends close to the anal fin. The head is otherwise rough, sometimes also with scattered tubercles, and the skin of the body with small points. The pectoral fin is wide, and passes forward under the throat to be united with the narrow ventral fins, together encircling the sucking organ. Twenty rays in the pectoral; second dorsal and anal fins opposite each other; the first with nine rays, the second with eight. Tail with nine rays; outline of the fins generally waved. There are perpendicular lines at that part of the body where the greatest motion is exerted. In young individuals the prevailing colour is green; when older a blue tint succeeds; which in the larger females at last becomes black, except beneath. The male is, at least in the breeding season, of a bright pink beneath, as also on the fins, and a fine blue above. The bones of this fish are soft, as in the cartilaginous fishes. The Lumpfish is very retentive of life.

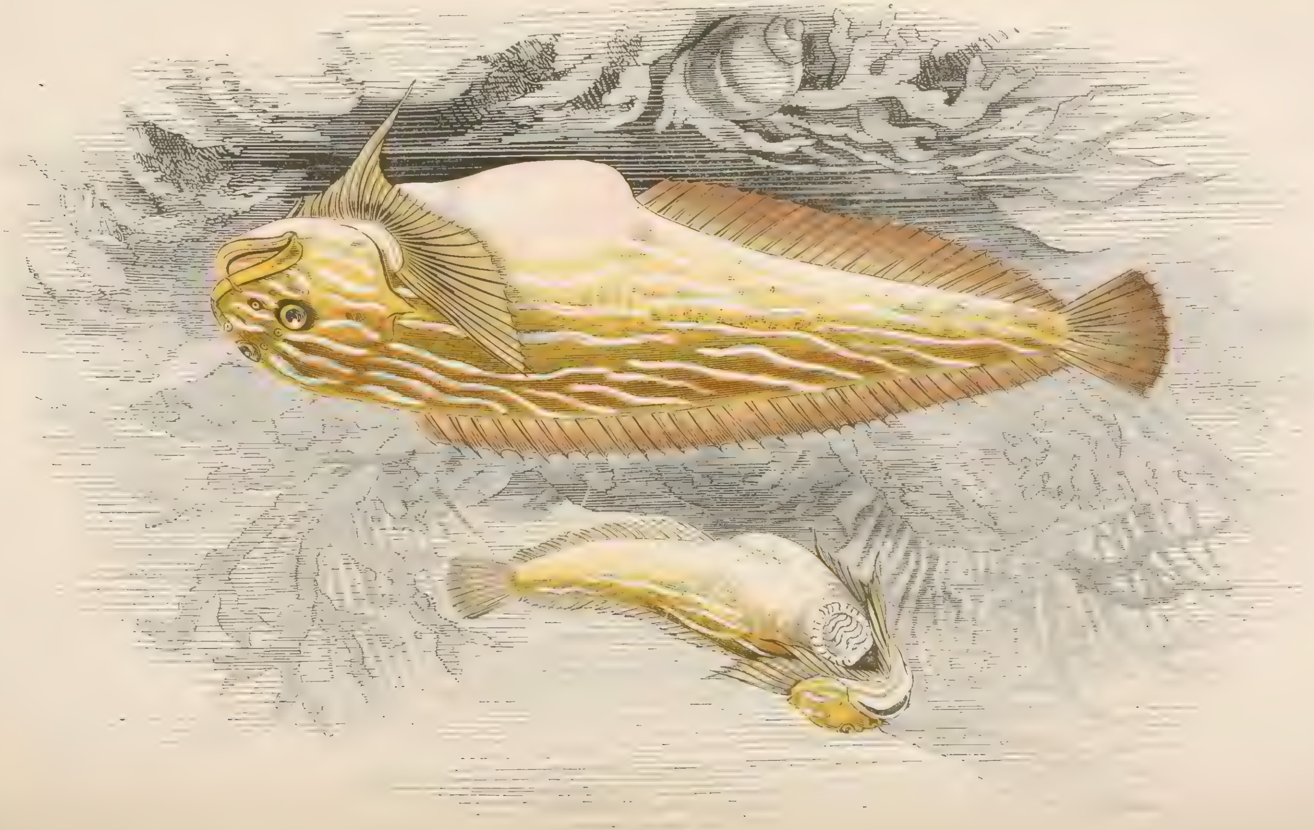
LIPARIS.

The head moderately short, body lengthened, compressed nearer the tail; a single, lengthened dorsal fin. The surface of the body smooth.

SEA SNAIL.

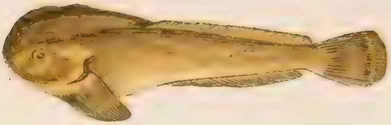
Liparis nostras,	Willughby; Appendix, p. 17.
" "	Ray; Synopsis Piscium, p. 74.
" "	Artedi; Appendix, p. 117.
Cyclopterus Liparis,	Bloch; pl. 123.
" "	Turton's Linnæus.
" "	Jenyns; Manual, p. 472.
Liparis vulgaris,	Cuvier. Fleming; Br. Animals, p. 190.
Cycloptere Liparis,	Lacepede.
Cyclopterus "	Donovan; pl. 47.
Liparis vulgaris,	Yarrell; Br. Fishes, vol. ii, p. 371.
" "	Gunther; Catalogue Br. Museum, vol. iii, p. 159.

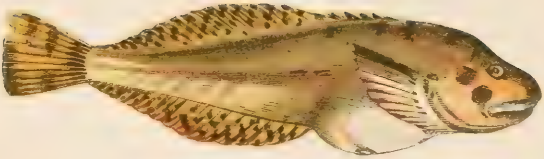
A fish is mentioned under the name of *Liparis* by some of the older naturalists, but in such a manner as to raise a doubt whether they are always referring to the species now understood by that name; for, although it may be deemed probable that the species called in the north of England the Sea Snail is one of the number thus designated, it is also certain that at least the fish which we shall call the Butter Fish, *Blennius gunnellus,* was also known by the same denomination. But the principal difficulty in deciding on the present species from the description of these ancient writers arises from the fact that they make no reference, or a very uncertain one, to that characteristic organ the sucker; which is indeed referred to by Willughby and Ray; but only as a mark resembling a seal; and probably it is on this account that Linnæus hesitated in accepting it, although it

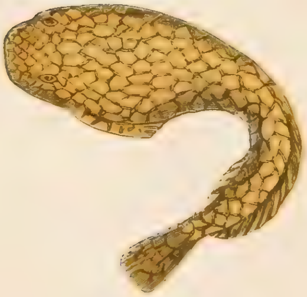


finds a place in his classification by Artedi, with a generic character at this time not to be mistaken. It is plain, however, even from his own authority, that although the last-named author felt no doubt of the existence of this fish, he had never himself examined it, notwithstanding that from the authority of Nilsson, we learn the fact of its being met with sometimes on the coasts of Sweden. It is indeed, more than most others of this family, a fish of the north, for its range extends even to the icy regions of Spitzbergen; and it is also found at Kamtschatka, although whether in the ocean between these districts appears uncertain. On the north of Scotland and England it is not rare, and it has been met with even at the mouth of the Thames; westward of which it is among the rarest of fishes. Yet I have been informed of its occurrence near Weymouth; and on the authority of W. P. Cocks, Esq., a single example is recorded as having been found under a stone in the harbour of Falmouth. Its proper haunts appear to be not far from low water mark, where it seeks shelter under stones; but it also advances up into the fresh water of rivers, although perhaps never beyond the reach of the tide. Its food is the small crustaceous animals it meets with at the bottom, and its season of procreation is early in the spring. So oily or mucilaginous is the fleshy substance of this fish, that soon after death it melts away on slight exposure to the sun; on which account it is that it has received the name of Sea Snail.

The Sea Snail attains the length of four or five inches. In its shape the parts in front of the dorsal fin are round and heavy, but towards the tail more compressed and tapering. Eyes high on the head and prominent, but not close together. The snout blunt and rounded; jaws equal, the teeth only rough; upper lip with two short threads or barbs. A process of the integument on the gill-cover stretched over the small opening of the gills. Skin smooth and soft, without tubercles. Belly protuberant; a single dorsal fin, which begins only a little behind the head; anal fin also single, and both these fins run back to be joined to the tail, but not amalgamated with it. Tail round; sucking organ round, on the throat. Pectoral fin wide, upper rays longest, but again lengthened near where united to the ventrals; and which together encircle the throat. The colour is liable to variation; the back and fins of different degrees of brown; light on the belly. The back and sides ornamented sometimes with longitudinal waved stripes of a light tinge, edged with tints of blue; but soon after being caught the colour is said to change and grow pale. The Rev. Mr. Holdsworth informed me that of three examples he had met with two were covered with narrow longitudinal lines as usually described, but the third was blotched all over with white on a very dark ground, not unlike some individuals of *Cottus bubalis.*







1 MONTAGU'S SUCKER. MALE.

2. MONTAGU'S SUCKER.—FEMALE. 3. NETWORK SUCKER.

CVII

MONTAGU'S SUCKER.

Liparis Montagui,	Cuvier. Fleming; Br. Animals, p. 190.
Cyclopterus Montagui,	Jenyns; Manual, p. 473.
Liparis Montagui,	Yarrell; Br. Fishes, vol. ii, p. 374.
" "	Gunther; Catalogue Br. Museum, vol. iii, p. 161.

This species was first described by George Montagu, Esq., who was commonly known as Colonel Montagu; and from that circumstance it obtained its secondary name. It is common on the shores of Cornwall and Devon, and also, as we learn from Mr. Thompson, round the coasts of Ireland; but it becomes more rare as we proceed northward or greatly to the south, although, as Mr. Peach informs me, an example has been obtained at Wick, in Scotland. With us it is seldom taken beyond the depth of four or five fathoms; and in the spring we discover it near low water mark, not unfrequently left by the tide and lying hid under a stone; in which position when uncovered, without much effort to escape, it usually assumes the curious habit of throwing its tail forward towards the side of the head. Its time of spawning is in the spring, and it has been seen greatly distended with spawn at the middle of April, the spawn lying very loose in the ovary. As food four examples of the Sandhopper have been taken from the stomach of a single individual. Some individuals of full growth were placed in a bottle with sea-water, where they readily attached themselves by the sucker to the sides, and even to the top with their backs downward; and when they chose to shift their places they as readily attached themselves to the fixed object again. At times their motions were lively, but at other times the contrary. The actions of the dorsal fin appeared as if the hinder portion only moved; and as the structure of the anterior portion is more stout and fat than that which is nearer the tail, and the rays more separated and not so high, the appearance is as if there were two dorsal fins.

The females, as far as they have been seen, are larger than the males, and the longest of them measured three inches. The head broad, flat on the top, cheeks tumid; the front descending from above the gill-covers; snout rounded and protruding; under jaw beneath, a rough bed of teeth in each; mucous orifices large round the mouth. Eyes lateral; the body round, forward, compressed posteriorly; the skin smooth. The dorsal fin begins opposite the half of the pectoral; the anterior portion low, and suddenly expanding above the origin of the anal fin; behind this both the last-named fins correspond to each other, and end near the root of the tail. In examples which I consider the male I have found these fins expanded at their termination; but in the females wider at the middle, and narrow behind. Tail slightly round, or straight. Pectoral fin has its rays longest above, but in a narrower form it unites with the ventral to pass under the throat in front of the sucking organ. The latter has thirteen protuberances, of which the odd one is in front, like the keystone of an arch. The vent is in the middle of the body. The general colour is a chesnut brown, light on the belly: some examples are much yellower; a row of small white dots sometimes runs along the lateral line; brown bars on the dorsal and anal fins, and on the tail; with a tinge of pink on the border of the pectoral fins and belly. Those last-named marks I have only seen on the female. The fin rays are, in the dorsal twenty-five, anal twenty; in the pectoral twenty-two, and ventral, counted separately, seven. In the tail eleven.

NETWORK SUCKER.

Liparia reticulatus,	Risso?
Lepadogaster bimaculatus,	Gunther; Cat. Br. M., vol. iii, p. 514.

The naturalist Risso describes under the name here given a kind of sucking fish which he supposed new to science, and which he had discovered in the Mediterranean. The specific character which he assigned to it is,—the colour a dusky yellow, with a network of grey and black; the dorsal and anal fins opposite each other and not united to the tail. In his description he also remarks that the muzzle is short and round, and the jaws of equal length; but he further adds, with some apparent contradiction, that the dorsal fin, which is furnished with six rays, is placed immediately over the tail, and the anal with only four rays is opposite to it, but both of them are at some distance from the tail. But setting aside these last-named particulars, if the fish thus referred to be indeed a distinct species, and not a variety of Montagu's Sucker, as Dr. Gunther supposed it to be, we may then venture to claim some Cornish examples as the same with Risso's fish, and as such one that has not hitherto been recognised as belonging to the British Catalogue. Three species have been examined, and all of them from a very limited extent of coast, at the depth of only a few fathoms; but of their particular habits nothing further has been ascertained.

The length was very nearly three inches. In comparison with an example of Montagu's Sucker the front appeared wider, head more depressed, dorsal and anal fins shorter, and approaching less nearly to the tail; sucking organ with the same number of tubercles. The general colour was a dusky yellow, lighter on the belly; but the whole surface of the skin and fins was covered with a network of lines, of which the meshes in different parts only varied in being more or less small. They were so especially in front, from the eyes to the mouth. When an example had been preserved for no long time in diluted spirit of wine, this beautiful network disappeared.

LEPADOGASTER.

The body is depressed from behind the head forward, compressed on its hindward half to the tail; the upper jaw lengthened into a narrow flattened snout. The sucking organ is divided into two portions, of which one is bordered by an union of the pectoral fins, and the other by the ventrals.

CORNISH SUCKER.

SUCKING FISH. JURA SUCKER.

Cycloptere spatule,	Lacepede.
Lepadogaster Cornubiensis,	Fleming; Br. Animals, p. 189.
Cyclopterus ocellatus,	Donovan; pl. 76.
Lepadogaster biciliatus,	Risso; p. 73, pl. 4, f. 9.
" *Cornubiensis,*	Jenyns; Manual, p. 469.
" "	Yarrell; Br. Fishes, vol. ii, p. 359.
" *Gouanii,*	Gunther; Catalogue Br. Museum, vol. iii, p. 510.

The species termed the Cornish Sucker is so named because it was first noticed in that part of England; and it is there still regarded as being pre-eminently the Sucker, from being the most frequently met with of this family, and especially because the propensity to exercise the adhesive faculty immediately excites the attention of a casual observer, who may chance to take it in his hand, to which with a slight flutter it soon becomes attached. Rest and inertness form indeed a prominent portion of its habits; and it will continue to fasten itself to one place without moving for many hours together. When disposed to move from one station to another, it presently again assumes the same fixed attitude, which it will sometimes continue by means of the mechanical operation of the sucking organ, even after death. There is reason to believe that it is not found in water exceeding a few fathoms in depth; but it is widely distributed, and has been noticed round the shores of England and Ireland. Risso, as referred to, also classes it among the fishes of the Mediterranean. Its food is the smaller crustacean animals, which it swallows whole. It is large with spawn in March, and the grains are of considerable size in proportion to the bulk of the fish. I have found what might be thought a little family of five or six of different sizes, under one stone.

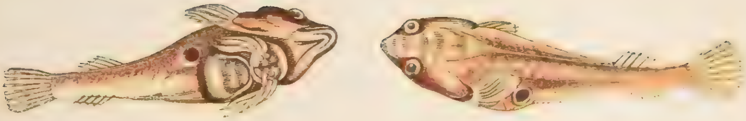
A full-grown example of the Cornish Sucker measures four inches in length; the forward portion of the body and head depressed and broad, but it sinks before the eyes, and the snout grows narrower, and projects in the form of the bill of a duck, although proportionally wider. The gape is wide, lips membranous, under jaw narrow, and shorter than the upper. Eyes lateral; nostrils at a small distance before them, and close to each nostril two threads or processes, the longest of which in an example two inches in length, measured the tenth of an inch, and is branched like a deer's horn. The body becomes compressed opposite the dorsal fin, and tapers to the tail. The single dorsal fin begins at two thirds of the whole length; the anal fin begins behind this, and both run back to be joined to the tail; the latter small and round. Pectoral fins behind the greatest breadth; united to the sucking organ, which is a double disk, separated by a channel; their circles formed of small tubercles. The colour varies from purple, with a tinge of pink, to crimson or dull red; the belly pale red; and the colours of the body extend to the fins. Behind the eyes are two round spots, of a darker colour than the general surface, with a centre marked with light blue, and a light coloured border; in some cases these outer borders touching each other, with a light coloured line stretched out behind each of them; and across, from one eye to the other, a straight band, with one or two bent lines, having an angle directed backward.

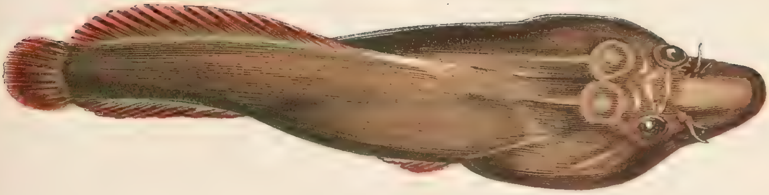
DOUBLY SPOTTED SUCKER.

Cyclopterus bimaculatus,	Turton's Linnæus. Donovan; pl. 78.
Lepadogaster "	Fleming; Br. Animals, p. 190.
Lepadogastère ocelle,	Risso.
Lepadogaster bimaculatus,	Jenyns; Manual, p. 470.
" "	Yarrell; Br. Fishes, vol. ii, p. 363.
" "	Gunther; Catalogue Br. Museum, vol. iii, p. 514.

We only give the English name as above, because it has been so applied by several writers; for it is but slightly descriptive, and might with greater propriety be assigned to the Cornish Sucker. The species which bears it was first made known by Pennant, but since his day it has been found far from uncommon in the west counties of England; and if we are right in our belief that it is, as Risso supposed, the same with that which he has called *Lepadogaster ocellatus,* it is also met with in the Mediterranean. On the other hand Nilsson says it has been taken off the west coast of Norway; where, however, it is regarded as among the rarest of their fishes. In Cornwall examples of small size are met with under stones near low water mark; not far from which it is probable they are bred. They are also not unfrequently drawn up in crab-pots; but the larger individuals prefer deeper water, and their common resort is further from the land than is usual with the Cornish Sucker, from which beyond doubt it is a distinct species. An example an inch and a half in length, was thrown from the mouth of a fish as it was drawn up from a depth of thirty-eight fathoms.

A small example, placed in a cup of sea-water, appeared more active and observant than the last-named fish; and even when the body was still the pectoral fins were frequently in





1. DOUBLY-SPOTTED SUCKER.

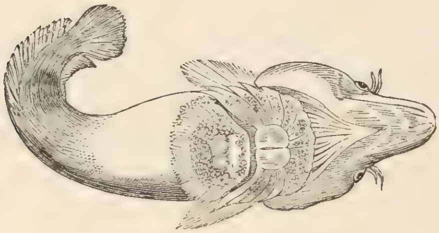
2. CORNISH SUCKER.

CVIII

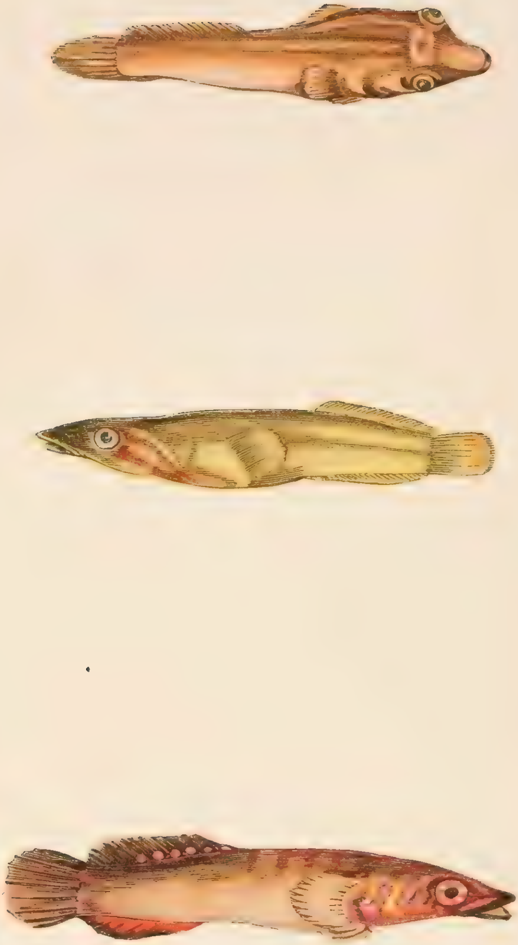
motion. While quiet, and attached by its sucker to the cup, the tail was usually thrown forward either to the right or left, and so bent that its fin reached to the gills, in the manner of Montagu's Sucker, and in this posture it was able to move forward, as if by the action of the ventral fins. The grains of spawn were of large size in May; and on this portion of its history, Mr. Thompson, in his "Natural History of Ireland," vol. iv, affords us some further information. He says, "Mr. Hyndman, when dredging (the 20th. of June,) off St. John's Point, County of Down, brought up from the depth of fifteen fathoms, a perfect and full-grown specimen of the bivalve shell *Venus Virginea*, in which were a *Lepadogaster bimaculatus*, with its ova and young, some only of which had made their appearance; and the same gentleman at the end of August, in the same year, dredged in Belfast bay a single full-grown valve of *Pectunculus pilosus*, the hollow of which was closely studded over for the space of a square inch with the ova of this species, each ovum touching or close to the next one. These ova are deposited singly over the surface of the shell on which every one rests; each ovum globular, about one sixteenth of an inch in diameter, which is remarkably large for a species which I have not known to exceed two inches in length. I had frequently seen this species when brought up in the dredge within old single valves of bivalve shells, but until the instance just mentioned occurred I was not aware of the cause of its partiality for them." Mr. Thompson, of Weymouth, has observed the same thing in the upper valve of an oyster shell, and says the fish remains near its spawn until it is hatched.

This fish reaches the length of about two inches, and in many particulars bears a not distant likeness to the more common Cornish Sucker, although a decided difference will be seen between them when examples of each are laid together. Thus in the present species the cheeks are not so full, and the snout is shorter and sharper. The colour is always very different, being of a light reddish orange, without those spots which are behind the eyes in the Cornish Sucker, and which are always present, even in small examples of that species. The tail in each is more or less round; but the most remarkable and decisive distinction between them is in the situation and extent of the dorsal and anal fins, which are short in themselves, and at a considerable distance from the tail. The number of rays in the former has been counted as from five to seven, and those of the last-named fin one or two less. Mr. Thompson had counted only three, but he supposes the fin to have been injured. When viewed obliquely an obscure tabular process was observed in front of each eye; but this could not be discerned except when the fish was alive in the water; obviously, however, their absence ought not to be made a portion of the specific character.

The colour of different examples varies considerably. Thus in one it was light brown, with a number of dots of cærulean blue between the eyes, and others of smaller size extending half way back to the tail; colour of the pectorals pale pink. No more than eight rays were counted in the tail; which is the more remarkable, as Mr. Thompson assigns to this organ twelve and thirteen, and Mr. Yarrell ten. The name of this species has been assigned to it from two remarkable and beautiful spots which adorn the sides, one on each, near the pectoral fin; but they frequently are not to be seen, without regard to the size of the fish; and I have never been able to perceive them in examples obtained close to the shore.



Sucker of the Cornish Sucker.



CONNEMARA SUCKER.

CIX

CONNEMARA SUCKER.

GOUAN'S SUCKER.

Lepadogaster,	Gouan; p. 177, pl. i, f. 6, 7.
Lepadogastere Gouan,	Lacepede. Risso.
Lepadogaster cephalus,	Thompson; Nat. Hist. of Ireland, vol. iv, p. 214.

The references here given are placed together from the belief that they are applicable to the same species, and of which the figures we supply may be said to be the first that have been published. They are at least new in British natural history; and we add, that if the three contained in our plate may be supposed, from their different appearance and colour, to belong to two distinct fishes, it will then follow that there are two species of this family which are now for the first time arranged among British fishes. The figure given by Gouan does indeed display some differences from those which are here produced; but the engravings in that author's work appear to have been intended for diagrams rather than individual likenesses; and if there is found some difference of description in the works of Lacepede and Risso, that difference especially is at variance with the extended notice of the fish in the work of Gouan, which still these writers refer to as their authority. The last-named author describes the surface of his fish as treslisse, and in Latin lævissima, or very smooth, as we have found it when fresh from its native element; but according to Lacepede and his follower, Risso, the skin is marked with slight tubercles or granulations.

But justice will not be done to this portion of the subject unless we quote the remarks of Mr. Thompson; for although the opinion of that gentleman may in some degree appear to differ from that which we advance, there can be little doubt that the species he has met with in Ireland is the same that will be here described. "In the collection of Dr. Ball, of Dublin, there is an apparently undescribed species of *Lepadogaster,* which was taken in Roundstone Bay, Connemara, on the western coast of Ireland. From the two British species already known, *L. bimaculatus* and *L. Cornubiensis,* this fish is very different. It cannot be that alluded to in his paper on the fishes of Cornwall, by Mr. Couch, ('Lin. Trans.,' vol. xiv, p. 470,) as allied to the latter, nor can it be mistaken by any ichthyologist for the *L. Cornubiensis,* which has been described so differently by authors, as to have led Mr. Jenyns to remark in reference to it, that 'possibly we may have two species in our seas which have been hitherto confounded.' A critical comparison shews that the fish under consideration agrees not with any of the eleven or twelve (?) species described by Risso as inhabiting the Mediterranean. Of these the *L. biciliatus* is considered by Mr. Yarrell to be the same as the *L. Cornubiensis.* Although in the depressed form of the head this fish resembles more the minute species, *L. bimaculatus* than the *L. Cornubiensis,* yet its equalling the latter in size, and having with it the dorsal and anal fins occupying a considerable portion of its length, renders it only necessary to be compared with this species. In general form it differs much from *L. Cornubiensis.* Though narrower in the snout, it is of greater breadth across the posterior part of the head; it is also much more depressed in the anterior half, and narrower suddenly behind the ventral disk, being to the tail compressed and tapering. In *L. Cornubiensis* the body slopes gradually from the head posteriorly."

It is probable that this fish is limited to particular districts, and the few examples that have fallen into my hands have only been obtained at very low tides, under a stone, or in shallow water.

The length of the example selected for description was two inches and a half, and the general shape much like that of the Doubly-spotted Sucker; but from this it is immediately distinguished by the much longer dorsal and anal fins, the former of which begins nearer the head, and both approach close to the tail. From the Cornish Sucker it is distinguished by the difference of proportions, particularly of the head and snout, and more especially by the absence of the ocellated spots behind the eyes, as well as by the much smaller size of the tendrils or cirri near the nostrils. Some marks are represented in Gouan's figure of this fish, but they appear only as faint stripes, and I have seen marks which appeared like them in only one individual, from which our description of the colours of this fish were taken. In another example the general colour approached to orange red, varied only in becoming paler on the lower surface; and in a third the anterior parts were dark brown, lighter, and approaching to yellow on the hindward part of the body, with two crimson lines running from behind the eyes downward to the sucking-organ. But the most beautiful of these examples was all over of a dusky red; the iris of the eyes with red radiations from the pupil. Two broad vermilion stripes on the cheeks, one from the eye obliquely backward, and another from the side of the head to the side of the sucker; pale vermilion bands across the back in front of the dorsal fin, which is dark, with six round bright vermilion spots along its root. Anal fin lively vermilion with a dusky border. The tail is round, and in the first-mentioned example the central rays were much lengthened.

LOPHIUS.

The head very wide, depressed, with protuberances; mouth capacious, armed with formidable teeth. On the head long, separate, moveable tendrils, distinct from the dorsal fins, which are two in number. Skin soft, without scales. Pectoral fins fleshy and horizontal, formed like arms, the bones of which resemble the bones of the human arm, but in reality answer to the bones of the wrist. Ventral fins like feet. The gill membrane wide, supported by long bony rays; the gills themselves on each side formed of three arches, opening behind the pectoral fins.

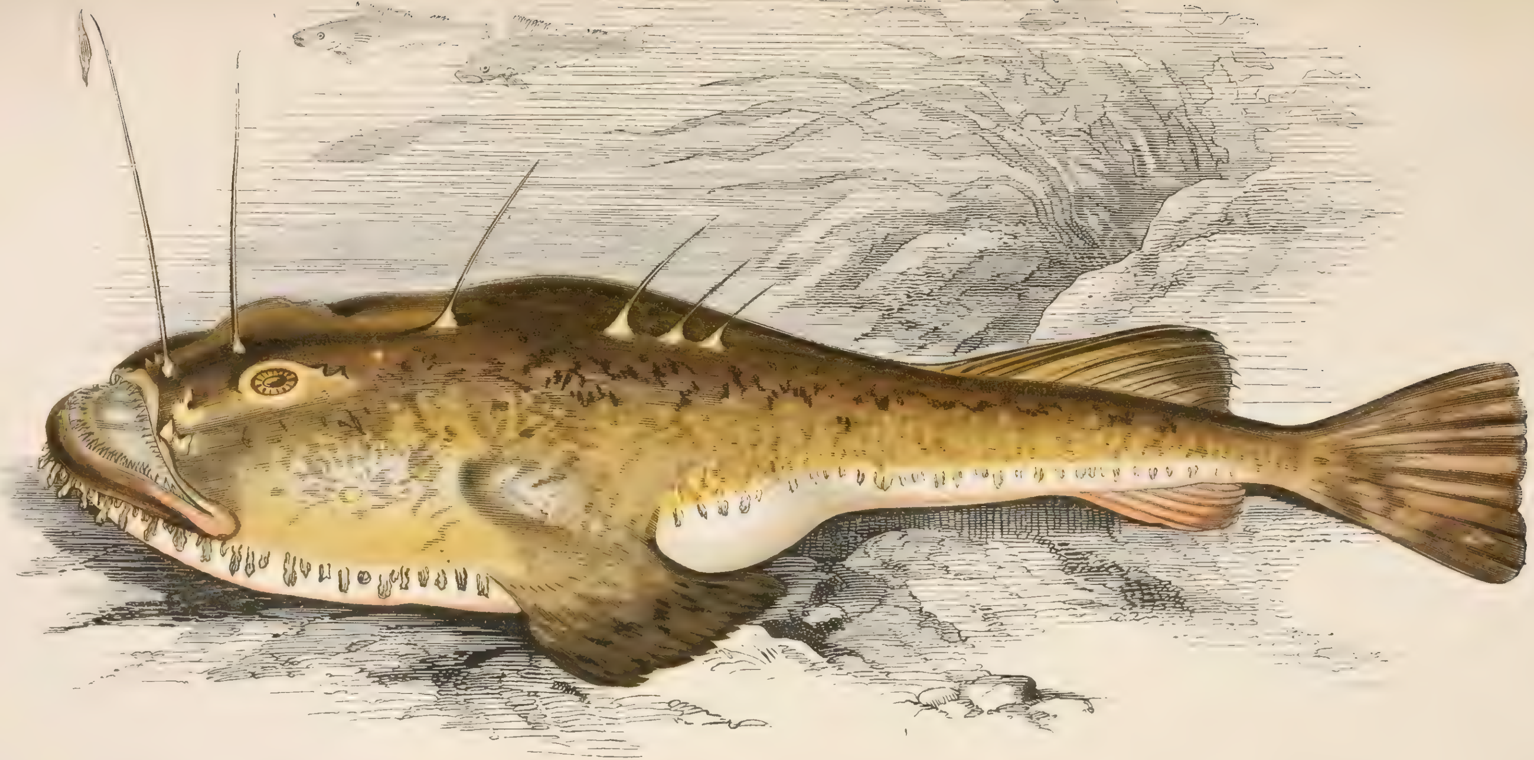
ANGLER.

TOADFISH. FROGFISH. FISHING FROG. SEA DEVIL.

Rana piscatrix, R. marina,	Jonston; Table 11, f. 8, p. 37.
“ “ “	Willoughby; p. 84, Table E 1.
Lophius piscatorius,	Linnæus. Cuvier.
“ “	Griffith's Cuvier, pl. 44.
“ “	Bloch; pl. 87. Donovan; pl. 101.
Lophie Baudroie,	Lacepede.
Baudroie Pécheresse,	Risso.
Lophius piscatorius,	Fleming; Br. Animals, p. 214.
“ “	Jenyns; Manual, p. 389.
“ “	Yarrell; Br. Fishes, vol. i, p. 305.
“ “	Gunther; Cat. Br. M., vol. iii.

This appears to be the fish which is described by Caius under the name of Ceruchus, but he does not seem to be aware that it had been noticed by any other writer; and indeed it may be true as he remarks, that he was the first that gave a precise description of it.

The remarkable form of this fish, in connection with its still more remarkable manners, had attracted the attention of observers of nature from the earliest times; and, strange to



ANGLER

CX

say, at a time when imagination, superstition, and imposture were united in ascribing to the inhabitants of the ocean mysterious properties, so that the circumstance of his inquiring into their nature and structure was believed to be a sufficient proof to shew that Apuleius, the Roman writer of the famous romance, the "Golden Ass," could be no other than a magician; and when in numerous particulars of form this fish differs much from all others that were known to the ancients, there was still less of the wildness of imagination applied to it than to a large proportion of others.

The general appearance of this fish, which is represented as at least unsightly, has caused it to be compared to a tadpole—a tadpole of course of enormous size; and when the rough protuberances of its head, and its projecting teeth and ample mouth, were taken into the account, its supposed hideous aspect was judged sufficient to entitle it to the name of Sea Devil. Yet in the form and arrangement of these parts we can discern a noble example of exquisite contrivance, by which, as in the corresponding instance of the apparently sluggish Lumpfish, what seems a defect is fully balanced by a skilful adaptation of instinct and inward organization to that definite end, which comprises the safety and comfort of the creature itself. It was the instinctive habits thus displayed that especially drew the attention of ancient philosophic observers; and accordingly we find them particularly described in the poet Oppian's verses, although indeed they are there accompanied with the addition of some particulars which tend to raise a doubt whether this generally accurate writer had closely studied the fish itself. He represents it as that

> "Within her jaws the fleshy fibre lies,
> Whose whiteness, grateful scent, and worm-like size,
> Attract the shoals, and charm their longing eyes.
> But as they near approach, with subtle art,
> The wily toad contracts th' inviting part."

A more accurate description of the organ and its use is given by Ælian, (B. 9, C. 24,) where he says:—"The Fishing Frog derives its name from the manner in which it employs itself. In front of its eyes there are placed some long processes, to the end of which are affixed enticing baits for the purpose

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of enabling it to ensnare little fishes. This Toadfish is aware of the use it may make of these organs to obtain food, and, for concealment, hides itself in some muddy place, where it keeps its body unmoved, while it lifts up and stretches out its line and bait. Little fishes that are wandering about are soon attracted, and begin to nibble, which the Angler is quick to perceive; and then it proceeds to move its line in a cautious manner, so as to lead the prey, without alarming them, into the gulph of its jaws, which close upon them beyond the power of escape."

The generally abrupt depth of water in our seas is a hindrance to the observation of such actions as these, but there does not appear to be any reason for doubting the accuracy of this account; and, on the contrary, an examination of other portions of the structure of this fish will tend to point out an extension of these powers in other directions. Thus, from the jaws round the border of the body to the tail there is found a row of membranous or cutaneous lobes, which, in most instances, at their extremities are divided into club-shaped partitions. These are not merely insensible doublings of the skin, but, although in a less degree, they perform the office commonly assigned to the fictitious bait suspended from the fishing-rod on the top of the head. They offer themselves enticingly to be nibbled by fishes that wander in that direction; and then is brought into exercise an organization which distinguishes the structure of the pectoral and ventral fins.

The species of this and the neighbouring family of Blennies possess the power to change their place as they lie on the ground, without an effort of the tail or dorsal fins; which latter organs are the instruments of motion in the generality of fishes, but which, if put into action by the Angler, would excite alarm, and so drive away the prey. The pectoral fin of this fish possesses such a framework of bones as is equivalent to the wrist joint of a higher class of animals; and the ventral also is so fitted with joints resting on a firm series of bones, to which also the pectoral is attached; and the whole is so well supplied with nerves of sensation, that, with a slow but sure and consciously-directed motion, the fish is enabled to creep in advance or retreat, or to turn itself round, and so lay hold of such incautious rovers as have crowded round it, and who are without a suspicion of the danger proceeding from the gaping but quiescent cavern of a mouth. And formidable indeed is that gulph which lies open to receive the prey, as hungry is the stomach which is prepared to receive it. "This fish is all one vast extended mouth," says Oppian; to which we may add by adaptation, from our English poet Spenser—

> "The open mouth, that seemed to contain
> A full good peck within the utmost brim,
> All set with dreadful teeth in ranges twain,
> That terrified his foes, and armed him,
> Appearing like the mouth of Orcus ghastly grim."

The extent of the mouth is indeed formidable, for in an example which measured four feet and a half in length, and weighed seventy-two pounds, this organ measured fourteen inches across; and this in action is capable of being greatly extended by means of several joints with which these parts are supplied, to a larger degree than in most other fishes. In opening the mouth the lower jaw is rather protruded than lowered. The upper jaw also is capable of some degree of protrusion, and at its symphysis a sidelong motion is also put in action, by which it appears possible that the Angler might be able to swallow a prey equal, or nearly so, to its own bulk, to which also a wide gullet can afford a passage and the stomach a welcome; while the skin of the body is so loose as to allow of any degree of distension without inconvenience, and there are no ribs on the sides that might offer a mechanical resistance. Nor can the food pass easily out of the stomach into the intestines without being entirely digested, for its lower or pyloric orifice is small, and there is reason for supposing that the process of digestion is itself slow. On one occasion there were nearly three quarters of a hundred of herrings found in the stomach of an Angler, and so little change had they suffered that they were sold by the fishermen in the market, without any suspicion in the buyer of the manner in which they had been obtained. In another instance there were taken from the stomach twenty-one Flounders and a Dorey, all of them of sufficient size and sufficiently uninjured to make a good appearance in the market where they were sold.

The teeth of this fish are set round the mouth like the prongs of a rat-trap, and are long, strong, and pointed; and those of the lower jaw are directed obliquely inward, so that as this jaw is withdrawn to close with the upper, these teeth may become interlocked together, and thus prevent the escape of the prey; while the teeth of the tongue and gullet, by the action of muscles which act on the latter, prevent such struggles as might obstruct the process of swallowing. The teeth appear to be in a state of perpetual renewal, and those of the inner row are for the most part the largest. They carry with them in their growth a covering of the membrane from which they are produced, and from it perhaps they derive nourishment long after their protrusion from the gums.

The instinctive force with which the Angler retains its prey when this has come within the grasp of these teeth, may be judged from a fact related by the natural historian Jonston; who tells us that the fish had been left on the beach by the receding tide, when a fox came prowling along in search of provender, and chanced to thrust its nose within the compass of the expanded jaws; which then closed upon it and held it fast, until, after a considerable time, it was discovered by people that were passing by. In another instance an Angler of large size was discovered by a couple of boys, in shallow water, in a boat where they happened to be without oars. But with the intention perhaps of annoying the fish, they loosened a board that lay along the bottom of the boat, and thrust it within the creature's expanded jaws, which immediately closed upon it. A struggle then commenced, but so firmly did the fish retain its grasp, that it suffered itself to be dragged out of the water and secured.

But sometimes stratagem will fail to supply the cravings of a hungry stomach; and then, in spite of its inaptitude for effort, the Angler will mount into the higher regions of the sea, and there without discrimination endeavour to glut itself with any object that may attract its attention. It has been known to grasp within its jaws the floating barrel which is usually fastened to the middle of the head-rope of a Pilchard sean; and it has swallowed a large whitewashed ball of cork which formed the buoy of a crab-pot, by which it became choked. When an individual was seen by a fisherman to be swimming near the surface, he threw his boat's iron grapnel at the fish, but, not terrified with the blow, it turned and seized the object as it sunk. A struggle again was observed at the surface, and on the approach of a boat it was found to proceed from an Angler in its efforts to swallow a gull, which it seems to have laid hold of as it was floating on the surface. The fish measured three feet in length, and had so far swallowed the bird, which was found to be the *Larus argentatus*, and which measured almost four feet six inches across from wing to wing, as that the stomach and gullet were filled, while the feet, tail, and ends of the wings projected from the mouth. The fish had become choked with the struggles of its prey, and they together now form a portion of a local museum. An Angler was seen to have seized a bird called the northern diver, *Colymbus gracialis;* but after a long and earnest struggle both the combatants were secured by a fisherman. And, however difficult it may be to imagine how it can happen that such an apparently unwieldy fish has been able to lay hold of the active birds and fishes we have mentioned, some portion of the difficulty will disappear when we know that in addition to the width of gape and stealthiness of approach, by a particular construction of the uppermost portion of the chain of vertebræ, by which a distance is preserved between the upper processes of those bones nearest the head and the head itself, the head may be lifted without any motion of the body; which is contrary to what takes place in the generality of fishes.

As another proof that the Angler sometimes seeks its prey at mid-water a fisherman had hooked a Codfish, and while drawing it up, he felt a heavier weight attach itself to his line; this proved to be an Angler of large size, which he compelled to quit its hold, as it grasped its prey across the mouth, by a heavy blow on the head, and the Codfish still remained attached to the hook. In another instance an Angler seized a Conger that had taken the hook, but after the last-named fish had been engulphed within the cavern of the mouth, and perhaps the stomach, it struggled through the aperture of the gills, and in that situation both the fishes were drawn up together. How indiscriminately these fishes feed on each other appears from the fact that in the stomach of an Angler which measured two feet and a half in length, was found a Codfish that measured two feet, and in the latter were the skeletons of two Whitings, within which again were other small fishes.

As this fish has on some occasions displayed a considerable degree of apparently stupid indifference to fear, with remarkable want of caution in avoiding danger, it has been concluded that its powers of perception are in a low degree; and this opinion is strengthened by noticing the small size of the brain in comparison with the bulk of the body. It scarcely fills half the chamber of the skull in which it lies, the remainder of the space being occupied with water, as in other fishes; and it is even said that this brain in bulk is but little above that of a sparrow. The whole head also is regarded as being in a condition of restricted or arrested development; for, as in most animals, in their embryotic state the head is proportionally larger in reference to the body than it continues to be in the state of perfect development, it has been judged that its existence in the magnitude we find it in the Angler, is a proof of the small development also of its other powers. But the abstract truth cannot be reached by such an analogy; and it is to be questioned whether a comparison of the brain of this fish with that of a sparrow be in any respect a just one.

There are in all creatures nerves and portions of the brain which are endued with special sensibility,—as that of seeing, hearing, and tasting,—but in which the anatomist, with his microscope, has not yet learnt to discern a different structure from that which is possessed by other nerves that are altogether insensible to such, or indeed any other conscious sensations. And again there exist creatures which, to all appearance, are guided by strong powers of reason in their animal actions, whose brains are vastly smaller in size than that of the Angler. The weight of the brain of the bulky fish and of the bird may therefore be the same, but we know that their form, extent of surface, and arrangement of parts are different, and it is probable that the internal structure of the lobes is still more so; as we know further is the expansion and arrangement of the nerves of the external development of the organs of sensation; in which last particular indeed this fish excels a large number of the other inhabitants of the sea. What appears to stand in the place of the olfactory portion of the brain exists as a separate globe of nervous matter, distinct from the united ganglions forming the true brain, although it is united to it by a bar or string of nerve; and from this anterior globe proceed some fine fibres which we should have described as passing forward to the perforated elevations above the upper jaw, which we suppose to form the nostrils; but we hesitate to say that these fibres are actually united to or expanded on these processes, since Professor Owen, whose accuracy in observation no one will question, has not been able to trace them thither. These processes are also furnished, at their root at least, with nerves of considerable size; but which are only organs of feeling, as is the nervous trunk from which these branches spring, and which conveys its powers of sensation over the face and to the corner of the mouth, with the neighbouring parts. As this nerve is the largest in the body, except the nerve of sight, we may believe it to bestow the functions of exquisite touch in a degree proportionate to its superior size.

There exists in this fish also, what perhaps we should least expect to find in it, an organ of hearing, which it possesses in a higher degree of development than in many other species. It is true there is no external orifice by which undulations causing sound can obtain access; but there is no reason to suppose that any modulation of sound is felt by any true fish. It is only a few varieties of noise or tone that is perceived by them; and in this particular the Angler is at least equal with the generality of the inhabitants of the ocean.

But to the eye of this fish we would direct particular attention, as in its structure we discern it to be better prepared for variety of vision than is the case with the larger part of bony fishes. The crystalline lens is large, by which means it is able to take in a wide range of vision; while its situation, far back in the chamber, and very near the retina or expanded fibres of the nerve of sight, from which, by bringing the rays of light to a short focus, the distance at which objects would be seen must be small, is changed, and a larger extent of perception secured by the compressing operation of the external muscles of the eye-ball; the lens itself being thus driven forward towards the front of the organ, where it is soft and flexible, and which thus is caused to project for the purpose of lengthening the focal distance. When this muscular pressure is removed, the action of a small muscle attached to the hinder portion of the lens, the existence of which in several fishes was discovered by Mr. Dalrymple, is employed to draw it again to its original seat. In common with some other kindred fishes, the Angler is able to move its eyes in various directions; and I think it probable that this is effected by each one independent of the other, as is certainly the case with the Blennies. From the appearance of lines or stripes on the iris of the eye, there seems reason to suppose also that this organ is capable of contraction and expansion; by which means the eye may be fitted to the varying degrees of light, as it exists near the bottom or at the surface of the sea.

This fish is retentive of life, so that when the skin has been kept moist it has been known to live out of its proper element for several days.

It is known that the race of this fish is continued by means of spawn, as in other bony fishes; but much obscurity has existed in regard to the early stages of its growth, and from the observations of Dr. Gunther, there seems to be a foundation for the supposition that in its young condition it has been mistaken for a different species. To elucidate the present state of this question we give much at large the remarks which that gentleman has published, in the volume of the "Annals and Magazine of Natural History" for 1861, page 6, together with some figures; but, as regards the latter, I prefer to give that of a specimen formerly in the possession of Mr. Yarrell, and which was drawn at the time of a visit to that gentleman. The specimen itself appears to have been obtained from the Mediterranean, but it answers closely to that one marked C in Dr. Gunther's Plate X.

"Small specimens of the European species of the Fishing Frog, or Sea Devil, are extremely scarce in collections, and scarcely any attention has been paid to the remarkable changes in the form of the body and fins, to which this fish is subject in age. Valenciennes is the only author who enters upon the subject at all. He says,—'The specimen examined is two inches long; the disk of its head is only one third of the total length; and the pectoral fins, which are as long as the head, appear to be more elongate than in old individuals. The same is the case with the tail, measured from the gill-opening. It appears to have a greater number of tentacles on the skin, especially on the pectorals; the margin of the pectorals appears to be finely ciliated. D. 11, (dorsal fin with eleven rays.) The differences from old individuals as we find them stated here by Valenciennes, agree, in the chief points, with our observations; but it is evident that Valenciennes took his notes from a mutilated specimen, in which the delicate appendages of the fins had been lost or shrivelled up, either previous to or during its preparation in spirits. The two specimens observed by Düben and Koren, on the western coast of Norway, were much more perfect; they were 94 mm. and 78 mm. long, and exhibited such remarkable differences from the specimens commonly observed, that those naturalists were induced to describe them as a new form, under the name of *Lophius eurypterus*, a species which we find adopted by Professor Nilsson, in his work, 'Skandinavisk Fauna.'

"The view of the fish represented is the most depressed one possible.

"I extract the following notes from the very detailed description:—The head is described as broader than long, less depressed than in *Liphius piscatorius*, its length (from the extremity of the snout to the posterior margin of the gill-cover) being one half of that of the remainder of the body, the caudal fin not included. The dorsal spines are comparatively short, the length of the first being only half of that of the second, or one fifteenth of the total length of the fish; the first terminates in a transverse cylindrical knob, which is provided with minute cilia; the two others have alternate fringes on both sides. The spines which form the continuous dorsal are similarly fringed; and the rays of the soft dorsal project very slightly beyond the membrane. The pectoral is exceedingly broad, and extends beyond the origin of the anal. The ventral also is broad, and can be expanded like a fan." The disproportion of this fin, however, in the two individuals observed is very remarkable. It is nearly twice the length in the larger one that it is in the smaller. The pectoral also is absolutely as well as relatively larger in this specimen than in the one figured, a difference by which perhaps the sexes are distinguished. During my last visit to Frankfort, Dr. Rüppell shewed me several small specimens of a *Lophius* collected by himself at Messina, which, after a careful comparison with mature ones, I declared to be the young of *L. piscatorius,* in spite of their apparent dissimilarity, an opinion which had been entertained by Dr. Rüppell from the time that they first came into his hands. Having since compared those specimens and the account of Düben and Koren, with a sketch fortunately made by Rüppell on the spot, and kindly presented to me, I have now not the slightest doubt that *L. eurypterus* is identical with the Frankfort specimens, and that both are the young of *L. piscatorius.*

In the Mediterranean fishes the first ray is comparatively longer than in the Scandinavian, and terminates in two compressed flaps, which perhaps are only a more developed form of the transverse cylindrical knob in *L. eurypterus.* How variable the length and the shape of the fins and of their appendages are, even in specimens of the same size and age, is fully proved by the Scandinavian specimens, one of which has the ventral twice as long as the other. Further, the anterior dorsal spine, whether it serve as a bait to attract other fish, (which is by no means improbable,) or as an organ of touch, is constantly exposed to injury from the peculiarity of its function. Finding it, however, sometimes very long and fully developed in old fishes, we cannot hesitate to assume that it is reproduced when lost; and this appears the more probable, if we consider that portions of the fin rays, as well as of the barbels, are reproduced in other fishes. We cannot therefore think it a matter of any importance when we find the anterior dorsal spine of different length, and its tentacle of different shape. Both are subject to an indefinite number of accidental and individual changes, besides the constant differences by which the young fish is distinguished from the old one. Finally, another source of discrepancy in the descriptions and representations of the authors named, is the alteration which the fishes undergo by their preservation in spirits. A part or all of the tender filaments in which the rays terminate are easily lost, and the fins themselves are considerably shrivelled up, so that it would be impossible to reproduce a figure of the present Frankfort specimens similar to that which was made from them when they were quite fresh. The ventral fins are still longer in the Mediterranean fish than in one of the Scandinavian specimens, being, with the filaments in which the rays terminate, as long as the whole fish. Düben and Koren believe that the length of the ventrals indicate a sexual difference. I cannot share this opinion, which is contrary to what we observe in other fishes. If there are external sexual differences in a species, they do not appear before the individuals approach maturity. The young male and female of *Callionymus lyra* are perfectly alike.

"The Mediterranean and Scandinavian specimens agree in the chief points; their head, compared with mature individuals, is shorter and less depressed; the anterior dorsal spine is shorter than the following ones, which are more fringed; the pectoral and ventral fins are much longer and more expansible; the fin rays are produced into delicate filaments; in short, the young Sea Devils are provided with a down which is lost with age. There are two distinct species of Sea Devil in the Mediterranean Seas,—*Lophius piscatorius* and *L. Budegassa.* The distinctness of these two species has been doubted by most ichthyologists, the second (called by Cuvier *L. parvipinnis,*) having been founded on apparently variable characters, as colouration and number of the dorsal rays. The latter may be relied upon if immature specimens (not more than one foot in length) be examined; *L. piscatorius* having not less than eleven, and *L. Budegassa* not more than nine dorsal rays. But the anterior rays become very indistinct in adult specimens of the former, and are totally lost to observation by the process of stuffing, to which the large specimens are submitted. In consequence of this the Short-finned Sea Devil has not been admitted as a species by Valenciennes, Nilsson, and others, who perhaps never examined an individual really belonging to it, always taking incomplete specimens of *L. piscatorius* for *L. Budegassa.* Both, however, may be readily recognised at any age, by the form of the humeral spine, which has two or three tooth-like processes in the former, whilst it is smooth, simple, and lanceolate in the latter. *L. Budegassa* does not appear to grow to the same size as *L. piscatorius.* It will be evident from these remarks to which of the two species we refer the *L. eurypterus.* Although no mention has been made of the humeral spine, the number of its fin rays, (dorsal twelve and anal eleven,) and the absence of the true *L. Budegassa* in the northern seas, prove its identity with *L. piscatorius*."

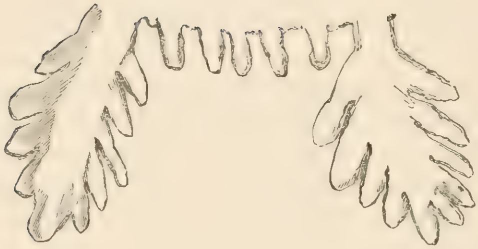
A remarkable portion of this subject is the rarity of this young condition, as compared with the commonness of the full-grown fish, and its prolific character. Mr. Thompson weighed the roe in an Angler which measured four feet and a half in length, and found the bulk enclosed in the membrane to amount to one pound and thirteen ounces; from which, with due allowance for the superfluous materials he calculated the number of grains to account to almost a million and a half.

This fish is not thought of for the table with us; but Jonston quotes an unknown author, Alexandrides, for the fact that it was produced at a feast given by Cotys, King of Thrace; and, according to Antiphonis, the belly was particularly esteemed. Willoughby says that when boiled the flesh is white, and in taste is like a frog; to which we may add that, according to Risso, a fish which he calls Genelli, and which he considers a variety of the Angler, is a delicious dish, as has also been reported by a private individual of our own Angler.

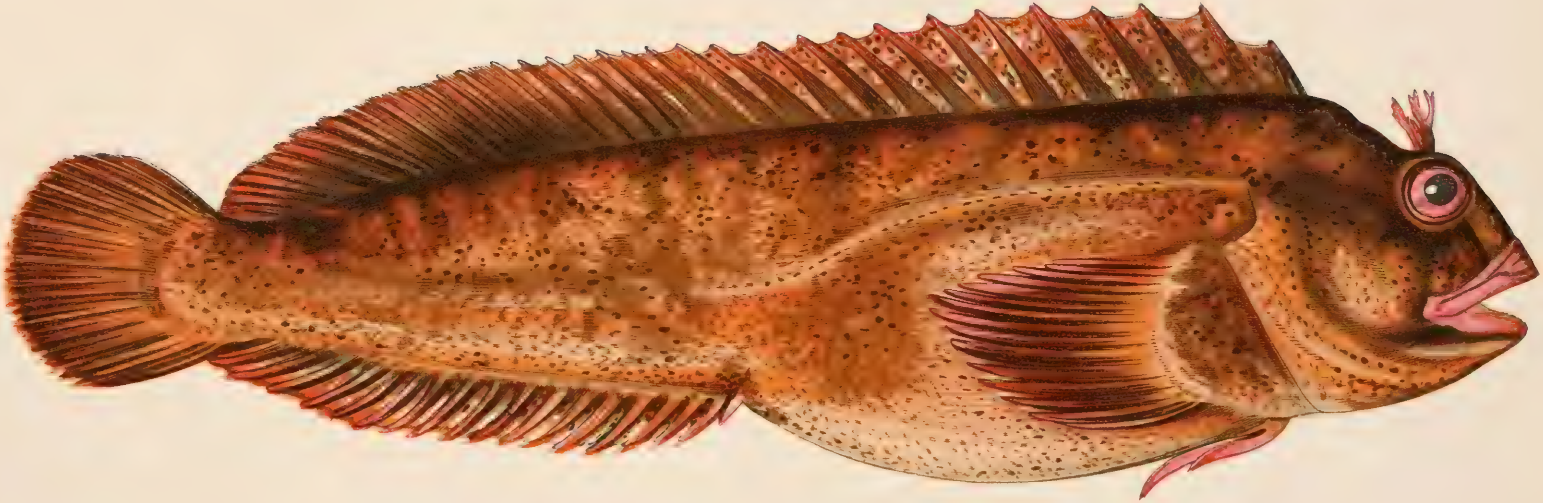
A large example of this species may measure between five and six feet in length, but the specimen described was three feet, and its breadth, across the widest expansion of the pectoral fins, about twenty-two inches. The head broad and rounded, forming a large proportion of the bulk; the body tapering behind the pectoral fins, and more compressed towards the tail. Head studded with bony tubercles, six in number, with a depression from the upper jaw upward between the rows, in which the processes of the maxillary bone are received. The under jaw projects, and is capable of great protrusion. Breadth of the mouth in this example ten inches, with two or three rows of long sharp teeth, the innermost row generally the stoutest and longest, especially in the lower jaw, and each tooth through much of its length encased in a separate membranous covering; in front of the palate also are rows of strong teeth, and the same in the floor of the mouth in the place of a tongue. Eyes high on the head, separate, with a depression between them; vision toward the sides. Round the body from head to tail a series of membranous processes, flat and lobulated, but of some variety in shape, the longest round the head. Skin smooth, loose, and slimy. Strong tubercles behind the eyes; the head covered with numerous irregular lines, from which proceeds a tenacious slime. Two short soft processes, already referred to, above the upper jaw; between them a slender upright filament, its interior structure bony, and which is joined to the bony structure of the head, in some cases by a ring joint, in others a portion of the ring is formed of soft substance. This forms the fishing-rod and line, its termination expanded, soft, hanging down like a bait, and in this example the whole was nine inches long. Behind this are five slender processes, obscurely united by a membrane, which may be regarded as the first dorsal fin, these processes or rays becoming gradually shorter; second dorsal and anal opposite each other, the former having twelve rays, the latter ten; pectoral fins horizontal, with twenty-four rays, joined to the body by a lengthened wrist, which is hid under the skin; and the longitudinal direction of the bones of the wrist causes this fin to be placed far behind, yet not so far as the gill-opening; which is situated behind it, and is so open in consequence of the low nature of its membrane and the length of the six slender branchial bony rays that by fishermen the pair are termed pockets. The ventral fins resemble slender paws, with six rays. Tail slightly rounded, with eight rays; all the fins thick and fleshy, with lobes or crenations at the border. The colour above is of various shades of dark or ashy grey, mottled, and in a younger condition prettily and regularly striped; white below; extremities of the fins often red.

Doctor Borlase, in his "Natural History of Cornwall," has described a fish, under the name of the Long Angler, which he supposed to be a distinct species, but which is now believed to have been a mutilated example of the fish we have described. He says it was of a longer form, the head more bony, rough and aculeated; with none of the fin-like appendages round the head, but there was a series of them on each side of the thinner part of the body, beginning under the (second) dorsal fin, and reaching to within two inches of the tail. On the border of the pectoral fin were spines an inch and three fourths in length, and at the end of the tail others three fourths of an inch long.

Ferguson also has described an Angler which he supposed to be a separate species, and which has been received as such by Lacepede, but of which no other example has since been recognised. It was caught in Bristol Roads in 1763, and was probably a variety of the common species. It was described as not having the body flattened above and below, nor compressed at the sides, but of a cylindrical form, and ending in a cone. Behind the upper lip were two hard elastic filaments, one before the other, long, but without a membrane at their extremity. It was in length four feet nine inches.



Form of membranous barbs round the jaws of an Angler



GATTORUGINE

CXI

BLENNIUS.

The body compressed, smooth, and slippery, without scales. Jaws equal, teeth in a single row. Dorsal and anal fins single, lengthened, with flexible rays. Ventral fins at the throat, each having (only) two rays.

This family of fishes was called *Alauda* by the older naturalists, because of a kind of crest which some species of them possess on the head, in which they are supposed to resemble the lark. The name of *Blennus* was applied by the same writers to several sorts of fish, because of the soft and greasy appearance of their skin; and in the History of Fishes by Jonston, the figure which may be supposed to represent the Dusky Skulpin is marked with that name. It was from Artedi that the present genus received its name, with a slight change from the older designation; and thus it became adopted by his friend Linnæus. There is reason to suppose that some fish of the same family, and probably a species of *Periopthalmus*, which has not been found in Britain, is the *Exocoëtus* of Aristotle; and that it was so named because it was believed to quit the water for the sake of repose; as we shall find that some of the genus now under consideration are known to do.

GATTORUGINE.

Gattorugine,	Willoughby; p. 132, pl. H. 2.
Blennius Gattorugine,	Linnæus. Cuvier.
Blennie “	Lacepede.
Blennius fasciatus,	Risso; p. 127.
“ *Gattorugine,*	Fleming; Br. Fishes, vol. i, p. 206.
“ “	Jenyns; Manual, p. 379.
“ “	Yarrell; Br. Fishes, vol. i, p. 256.
“ “	Gunther; Catalogue British Museum, vol. iii, p. 212.

This fish is known to fishermen of the west of England by the homely appellation of Tompot; but the Italian name, as above, will prevail with the more scientific portion of the public, although the signification of the latter is scarcely more lofty than that of the former. It seems to be heavy in all its motions, and its range of action is usually confined to the neighbourhood of rocks and stones not far from land; where it keeps close to the bottom at the depth of a few fathoms. It does not often take a bait, but this appears to arise from the fact that the ground it haunts is rarely fished over except by those whose pursuit is for crabs and lobsters; and in their pots it is so commonly taken, that in the season of this fishery it not unfrequently happens a few examples are drawn up in every one. A fisherman informed me that he has thus caught as many as fifty in a day. They are not thought of as food, although, according to Lacepede, they are acceptable for the table; but our fishermen are accustomed to use a degree of cruelty, by thrusting their ordinary skewer through the gills of the fish whilst yet alive, and so hanging it up in the pot for bait. It will continue alive in this state for two or three days, if not before devoured by the captive crab or lobster; to which it is believed that they are a welcome morsel. Its own food appears to be indiscriminate, but perhaps with a preference for the smaller crustaceans; but various sorts of bivalve shells and portions of star-fishes—the common jointed coralline and brown sea-weeds have been found in their stomachs. There cannot be a doubt also that they are enticed to enter the fatal crab-pots by an appetite for the fishy bait contained within them.

About the end of May they are found large with roe, the grains of which are some of them a mulberry and others a lead-colour. Numbers of young ones of very small size are also found at the same season.

It appears to be the habit of this fish, as it is of the Common Shanny presently to be described, and the Crested or Montagu's Shanny, to employ their pectoral and ventral fins as organs of feeling; and also in the place of hands or feet in crawling among the rocks with but little action of the other parts of the body. For this purpose these organs are well supplied with nerves and accompanying blood-vessels; and especially there is well developed a series which, as analogous to those possessed by animals of a higher order in the scale of existence, an anatomist would denominate the axillary plexus; which unite together and again divide as in something of a net-work, some of the branches penetrating through the bones of the pectoral fins, that both sides may be sufficiently endued with sense; the separate rays which possess the functions of fingers being thus furnished; and as one of the larger branches is seen to proceed forward from a different source, as concerns the other, we are led to conclude that the sense of touch and voluntary motion are equally present in these fins.

The Gattorugine is common in the Mediterranean, where it has obtained the name now usually applied to it. We have seen that it is also abundant in Cornwall, but it becomes more scarce as we proceed eastward or to the north. Mr. Thompson, of Belfast, obtained it on the coast of Ireland, and I have received examples from Weymouth, through the kindness of William Thompson, Esq., of that place. A specimen in the British Museum is marked as having been taken in the Frith of Forth, but it is not enumerated among the fishes of Scandinavia, by Professor Nilsson.

The Gattorugine sometimes exceeds the length of nine inches, but the example described measured only eight inches and a fourth, and at its greatest depth three inches, which includes the breadth of the dorsal fin; the general form short and heavy, but growing more compressed and tapering towards the tail. Eyes elevated and near each other, with a slight depression between them, and above each a fleshy process, which in different individuals is more less divided into branches. The front slopes suddenly from the eyes to the mouth; jaws equal, lips membranous, gape moderate, teeth fine and regularly set. In a single example a strong curved tooth was found in front of the palate. Cheeks fleshy and full. The back rises high suddenly behind the head to the beginning of the dorsal fin; the belly protuberant. Behind the vent a short tabular process. Lateral line bent down as it comes opposite the vent, and behind this it disappears. The dorsal fin begins on a ridge close behind the head, anterior to the opening of the gills, and becomes a little narrower above the vent, then wider but gradually lower as it approaches the tail, to the root of which it becomes united; as does sometimes the anal fin as it proceeds from the vent. Tail more or less round. All the rays of these fins fleshy, as are those of the pectoral fin, which is round; the rays of the latter projecting beyond the membrane. The ventral fins are on the throat, each one is divided into two fleshy processes, which separate near the root. The colour is usually reddish brown, much mottled and clouded:—the fin rays for the most part vermilion, as are the lips and tendrils over the eyes.

I have never known the fish as thus described to be left by the tide in any concealment; but on the other hand I have met with two examples thus left, which answered closely to the figure (Pl. 86) given by Donovan, to which Dr. Gunther refers as a representation of the Gattorugine, although very different in its colours. I scarcely venture to differ in this respect from an observer whose accuracy in general cannot be disputed; but if these instances only constitute a variety it is remarkable, and as coupled with a variation of habit also it is deserving of a distinct representation and description.—Fig. 1, Plate CXIII.

The smaller example of the two, which scarcely exceeded two inches in length, was found concealed under a stone at about low-water mark; and the larger, which measured four inches and a half, was taken from a cleft in a rock, where it had been left by the tide in the manner of the Common Shanny, which in shape it much resembled. A description of this specimen will be best understood by a comparison with those particulars of the Common Gattorugine, in which they differ one from the other. The eyes were less distinctly elevated,—in this respect resembling the Shanny more than the Gattorugine; the dorsal ridge only a little elevated above the level of the head; the belly less protuberant, and no separate process between the first ray of the anal fin and the vent. The dorsal rays comparatively higher, and their extremities more free of the membrane, the first ray in fact being lengthened into a short process. Processes above the eyes, each a single thread with lateral fibres; ventral fins undivided to a greater length; pectorals extending even beyond the vent, while in the Common Gattorugine it extends to little beyond half that distance. The dorsal fin especially is proportionally more expanded as it approaches the tail. A slight tuft of fibres project from the nostrils as the fish is seen alive in a pool, where it shews little signs of activity. The fin rays were the same as in the Gattorugine, with the slight exception of a single one in the dorsal fin and tail. The colours were beautiful, and much varied; the ground colour rich brown; a broad, light, crooked band from the eye to the cheek;

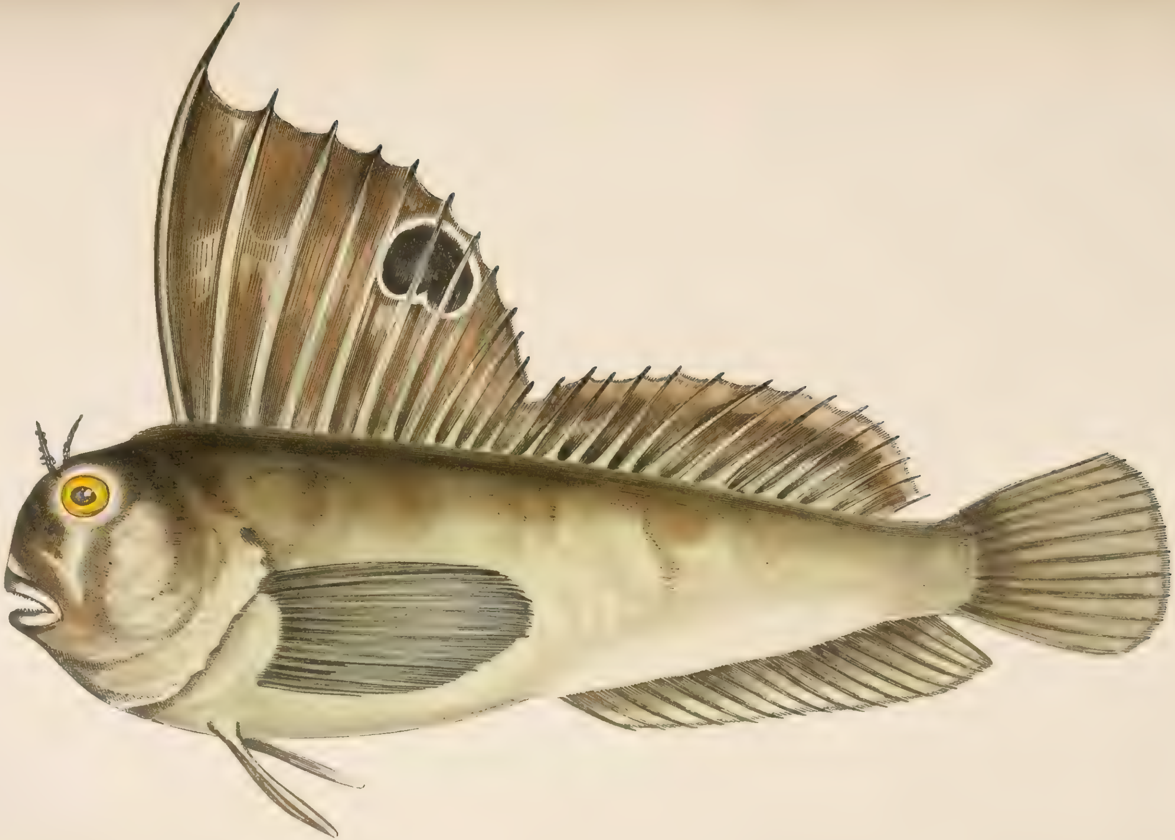
iris of the eye light blue; seven bands of dark brown pass down the dorsal fin to join corresponding patches on the body. Lips, throat, gill-membrane, pectoral fins, and tail, bright vermilion, as is the border of the dorsal, and hindward portion of the anal, the latter edged through its length with white. Root of the pectorals brown, and an ocellated spot between it and the gills.

BUTTERFLY BLENNY.

Blennius Bellonii,	Jonston; tab. 19. f. 15; but he appears to have confounded it with the Gobies, and gives it two dorsal fins; perhaps from a casual separation of the membrane, where in its perfect condition it is depressed; and so depressed that Willoughby remarks, without attentive observation this fish might be supposed to possess two dorsal fins.
Butterfly Fish,	Willoughby; p. 131, Table H. 3.
Blennie Lievre,	Lacepede. Risso.
Blennius ocellaris,	Linnæus. Cuvier.
“ “	Fleming; Br. Animals, p. 206.
“ “	Jenyns; Manual, p. 379.
“ “	Yarrell; British Fishes, vol. i, p. 253.
“ “	Gunther; Cat. Br. M., vol. iii, p. 222.

This species is common in some parts of the Mediterranean, but, according to Risso, not in others; and indeed it appears to be only locally distributed anywhere. Willoughby found it in the markets for sale at Venice, but Lacepede says it is indifferent food, to which Swainson adds that it only comes to the table of the poorer people of Italy. From the great height of its dorsal fin we may suppose that its habits and motions are different from those of several others of its genus; but they have not been particularly studied.

In the British Islands this fish is rare, even where it has been met with. Montagu was the first who noticed it by the capture in a dredge of three examples on the south coast of Devonshire; and Mr. Yarrell described it from an example which he obtained among the rocks at the Island of Portland. Mr. Thompson has obtained several at Weymouth. In the British Museum there is a specimen from Plymouth, which was presented to that collection by Lieutenant Spence, R.N., who employed his time and skill in preserving the skins of the fishes of that neighbourhood; and I am informed by W.



BUTTERFLY BLENNY.

CXII

P. Cocks, Esq. that it is scarcely uncommon at Falmouth. Dr. Vigors, of that town, was in the possession of one which was found in the empty shell of an old whelk, and which differed from the usual colour of this species in being perfectly white.

British examples have been generally of less size than those of the Mediterranean, where, as Willoughby informs us, this fish has been seen to exceed seven inches in length. The head is large and elevated, sloping suddenly from the eyes to the mouth; the lips membranous, and the gape appearing limited, although, as remarked by Willoughby and Risso, it is capable of being much expanded. The teeth are prominent and in regular order, with two canine teeth bent inward in each jaw. Eyes large, and high on the head; above, and a little in front of each, a tendril slightly fimbriated. Cheeks full. Belly protuberant. The lateral line begins at the upper portion of the gills, and is bent down as it passes beyond the fulness of the belly. A particular character of this fish is the high elevation of the first portion of the dorsal fin, which begins close behind the head, and its first ray rises high beyond the membrane, as, in a less degree, do the two next rays. This fin becomes much narrower at about the tenth ray, from which it again becomes wider as it passes to the root of the tail. The tail itself round; the ventral fins with two, and, Lacepede says, three rays; anal fin from the vent to the tail.

The colour, as well of the body as the fins, is liable to variation, but in its perfection it has a greenish tint, sometimes with blue spots, and mottled with olive-colour or brown. On the upper part of the anterior expansion of the dorsal fin is a large, and usually conspicuous dark or deep blue spot, with a light-coloured border, which spreads from about the fifth to the eighth ray. Mr. Yarrell describes his example as for the most part brown, and, as we have already seen, the specimen obtained by Dr. Vigors was white. A specimen taken in the Isle of Man, and described in the ninth volume of the "Magazine of Natural History," had the dorsal fin only slightly narrower in the middle. In one of Montagu's examples the spot on the dorsal fin was hardly visible. This dorsal fin numbers twenty-seven rays, pectorals twelve, anal seventeen, the tail twelve.

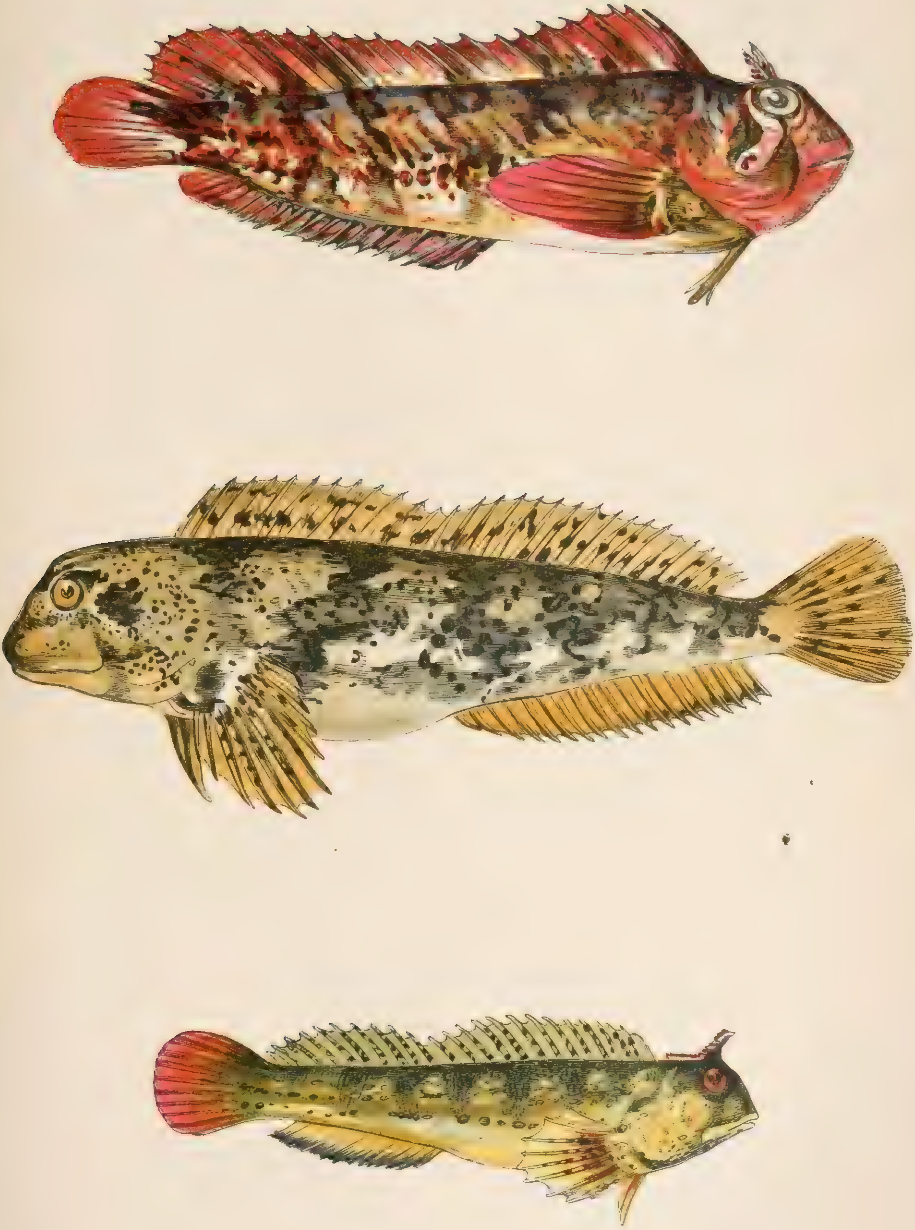
SHANNY.

MULLIGRANOC. SMOOTH BLENNY.

Pholis,	Jonston; Table 17, f. 4.
Alauda non cristata,	Willoughby; p. 133.
Blennius pholis,	Linnæus. Cuvier. Bloch; pl. 71, f. 2.
“ “	Donovan; pl. 71.
Blennie pholis,	Lacepede. Risso.
Pholis lævis,	Fleming; Br. Animals, p. 207.
Blennius pholis,	Jenyns; Manual, p. 382.
“ “	Yarrell; British Fishes, vol. i, p. 260.
“ “	Gunther; Cat. Br. M., vol. iii, p. 226.

The Shanny is well known in the Mediterranean, and is common along the borders of the British Channel; but it becomes more scarce on the east coasts of the kingdom, and is rarely found in the north of Scotland. Nilsson also says it is scarce on the south-west coast of Norway. It is nowhere met with at a considerable depth of water; but its haunts for the most part are in rocky places from which the tide retires to a small distance; and there it hides itself under a stone in a moist situation where weeds abound; or, more frequently, as the tide goes out, it creeps into a hole or chink in the rock, where it remains for an hour or two until released by the rising again of the sea. Its head in this situation is always outward, as this position affords it the opportunity of discerning the approach of an enemy; on the discovery of which it withdraws itself from sight with a backward motion to a deeper part of its retreat, by the help of its pectoral and ventral fins.

It is through an instinctive feeling of pleasure as well as of safety that this fish will quit the water for a time; and it is scarcely to be doubted that by this means also it secures a renewal of health and vigour, for when its resort is in a pool of the rocks from which the sea cannot retire, it climbs to some



1. [illegible] FISH.

2. SHANNY. 3. MONTAGU'S BLENNY.

CXIII

elevated spot that is out of the water, and there basks in the sunshine. But in this situation it exercises so large an amount of watchfulness, that on the approach of any object, and before it could be supposed that the object itself was seen, the fish is heard to plunge into the pool with an effort of agility that, in regard to another species of this family, which he calls Adonis and Exocœtus, and the habits of which he describes as resembling very closely those of our Shanny, Oppian compares to what is displayed by a dancing tumbler on the stage. In the pool itself it quickly flies to a shelter in some crevice where it can lie hid in safe concealment; nor is all this vigilance without sufficient cause, for it is liable to be sought out by the sharp bills of the cormorant and shag, which are often found diving in the neighbourhood of its resort. It may contribute in a material degree to its safety from numerous enemies, that this fish, no doubt like many others, is capable of directing its eyes separately in such opposite directions as to look backward and forward at the same time, as it is well known the chameleon is also able to do.

As this fish may be tamed or rendered in a slight degree familiar when kept in the captivity of a tank, an opportunity has thus been obtained of observing some of its habits more closely, and the following notes were made from such opportunities. The example particularly studied was more than half grown, but it obtained no increase of size for upwards of six months that its imprisonment lasted, at the end of which, as the reward of amusement afforded, it was restored to liberty in its native element. It often varied in colour, from no obvious cause. In warm weather it mounted on a stone in the tank, and there basked itself for hours together, so that in summer the full half of its time was spent out of the water; but when the air grew colder it remained under water, and when very cold it sought the securer shelter of a stone, under which it remained until the weather became again temperate or warm; but in no case were its actions in correspondence with the ebb and flow of the tide, as popular opinion would have them to be. In these instances of exposure to the sun and air we discern the admirable use of the slimy covering of the skin with which the author of nature has provided this fish and its kindred species; for without such a protection these characteristic habits could not be indulged, or the skin would become scorched and dry, and death would inevitably be the result.

It is obvious from these well-known habits, as well as from experiment, that this fish is highly retentive of life; and accordingly it has remained alive for several days when only covered over with moist sea-weeds. Lacepede records an instance where, as he supposed, a Shanny had made an attempt to feed on an oyster that lay with its valves open, in consequence of which it became shut up a prisoner by the closing of the shell. In this condition of confinement the fish had continued so long that the oyster had been dredged and carried to a considerable distance, when on opening it the captive was again set free, alive and without injury. It is necessary, however, that, in aid of this life-sustaining power, the moisture with which it is enveloped should be of sea water, for that which is fresh is fatal to it.

As the flowing tide comes to its habitation in the rock the Shanny is seen to glide from it in search of food, which is whatever it can obtain of an animal substance; and of which, with its well-arranged cutting teeth, it bites off portions, with an apparent struggle before it devours it. It feeds also on small shell-fish, and the sessile barnacles of the rocks. But in the eagernes of search it is exceedingly jealous of the interference or near approach of one of its own kind, which it immediately endeavours to drive beyond its own range of dominion, with the chance of a battle on the intruder. It is therefore not common to find two in or near the same hole; and when one was placed in a tank in which another had lived long alone, a speedy battle was the result. In consequence of this propensity for combat it is an amusement of children to set them fighting; when they will lay hold of each other with the teeth and long retain the grasp, as they will also do on the hand, although not capable of inflicting a wound. It may be partly from the dread of combats with each other that these fishes wander but little from their accustomed haunts; but it may also proceed from a want of power, for the heaviness of the body and head, and the absence of an air-bladder, are hindrances to raising themselves high in the water or passing over a considerable depth.

The spawn of the Shanny is shed in summer, and the manner in which it is disposed of and protruded has been observed within my own knowledge, and by the research of Mr. Richard Q. Couch; the contrivance displaying no slight degree of instinctive intelligence. The place selected is some small chamber among the ranges of its usual haunt as left by the tide, but nearer the low than high-water mark. The entrance to it is narrow, with a roof as little broken by crevices as may be; and the grains of spawn are laid close together on this roof and the sides of the diminutive cavern, where, as they are of a bright amber colour and a polished surface, each one about the tenth of an inch in size, they display a brilliant appearance, and the place looks as if it was vaulted with mosaic work. The parent herself has several times been discovered in this secret retreat, and on one occasion in the act of depositing her roe, the grains of which have been watched to their development. The young ones are of speedy growth.

The Shanny seldom exceeds five or six inches in length, but it has been known to measure seven inches and a half, with the weight of two ounces and a half. The head large, fleshy, with full cheeks; forehead high, sloping rather suddenly to the mouth; the lips membranous; jaws equal; teeth in an even row, with a single canine tooth in each lower jaw. Eyes of moderate size, high on the head; with a depression between them, and having no separate crest or filament above them; palmated filaments project from the depression of the nostrils below the eyes, visible when the fish is in the water, but scarcely to be seen at other times. The line of the back continuous with that of the head; body compressed, smooth, tapering towards the tail, which is round; lateral line scarcely perceptible. The dorsal fin single, beginning above the gill-opening, and rising at about half its length, and ending at a short distance from the tail, as does the anal fin, which begins at the vent. Pectoral fins round. All these fins have fleshy rays, which project beyond the membrane, and such is the case especially with the first half of the dorsal fin. The ventrals are firm finger-like processes, partially divided into two. In internal structure the pectoral and ventrals resemble those of the Gattorugine. The colour various, sometimes almost uniformly deep green, or mottled with yellow and white. The fin rays,—of the dorsal thirty-one, of which twelve are in the first division of the fin; anal fin nineteen; caudal eleven; pectoral thirteen; ventral two. There are eighteen teeth in the lower jaw, between the two hooked canine teeth.

In one instance there has been met with a curious deviation from the usual structure of this fish, and that too in an important particular. It was fully grown, but on the left side was altogether destitute of a pectoral fin, and in the place of it a depression which shewed that the loss was not the consequence of injury. But as a compensation for this there were three rays instead of two in the ventral fin of that side. This additional ray was less in size than the others.

MONTAGU'S BLENNY.

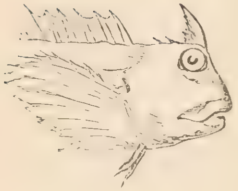
Blennius galerita,	LINNÆUS. JENYNS; Manual, p. 381.
" "	GUNTHER; Cat. Br. M., vol. iii, p. 222.
" *Montagui,*	FLEMING; Br. Animals, p. 206.
" "	YARRELL; Br. Fishes, vol. i, p. 249.

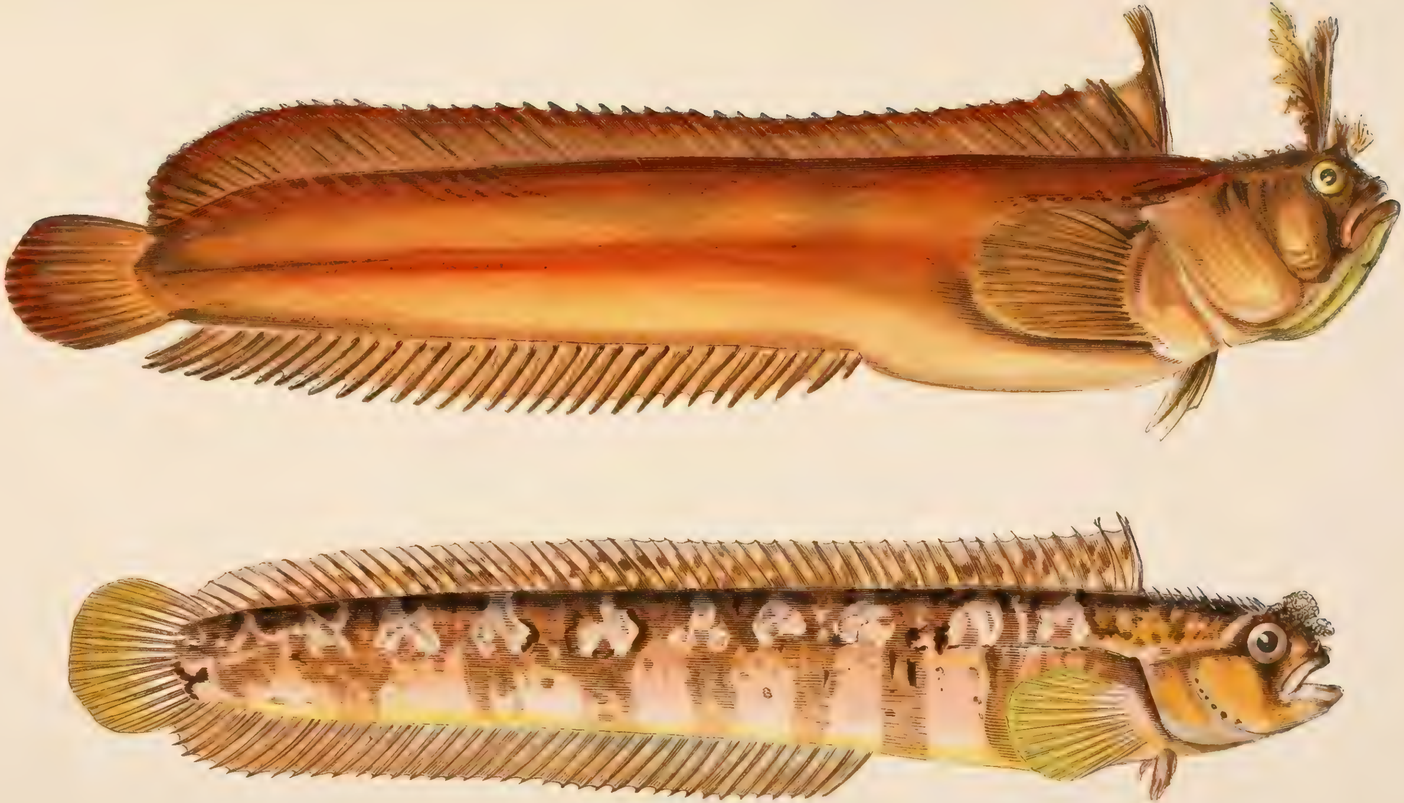
THERE is much confusion in the synonyms of this species, but the opinion of Dr. Gunther is that the fish now represented and described is the true *B. galerita* of Linnæus and of Montagu, and that the difference of description by Fleming and others applies only to some casual variation of structure. Yet we are desirous of retaining the common English name of this fish, in memory of the indefatigable Montagu who first discovered it in Britain, and also because the designation of Crested Blenny has been appropriated to another species.

Montagu's Blenny is found further to the south than the Shanny, being known in the Island of Madeira, as also in the Mediterranean, and even in the Black Sea; but it is less common than that species even in its appropriate limits, and it is rare in the north of Britain. Nor does it often, like the Shanny, seek shelter in a hole so as to continue out of the water, and its more frequent haunts are in pools of the rocks, where a crevice affords it a convenient hiding place. It takes a bait, but less eagerly than the Shanny.

This species probably is the fish, or one of them, that is mentioned by Belon as being employed as a bait for shore lines in catching the larger fishes; but with us the species of this family are not employed for any useful purpose.

Montagu's Blenny is best described by comparison with the Common Shanny, to which it bears considerable likeness, although it never reaches beyond half or two thirds the size. The form is also somewhat more slender, and the head less heavy; but the more remarkable difference, and that which constitutes the particular character of the species, is the crest or elevation which stands erect across the hinder part of the head. This is also slightly fringed at the border, and behind it are a few less elevated thread-like processes. The membranous border of the mouth at the corner is lengthened out, and when the fish is in its native element it is so stretched out as to shew that it is probably endued with particular sensation, (see figure below.) The crest is sometimes placed further in advance than it appears to be in other instances. The under jaw is rather feeble; first portion of the dorsal fin proportionally a little longer than in the Shanny. The colour is for the most part more varied than in that fish, but with similar tints; and the mottled markings are carried under the throat, where in the other fish they do not shew themselves. The crest has usually a red margin, and the tail also is tinted with red.





YARRELL'S BLENNY.

CXIV

BLENNIOPS.

The body lengthened, having small scales. Head sloping to the mouth; over the eyes elevated and bordered branched or fimbriated tendrils. Dorsal fin long and even, except the first two or three rays, which are longest, and tipped with tendrils. The scales are scarcely or not at all visible when newly from the water, and they do not overlap each other.

YARRELL'S BLENNY.

Blennius galerita,	Fleming; Br. Animals, p. 207.
" *palmicornis,*	Jenyns; Manual, p. 380.
" *Yarrellii,*	Cuvier. Yarrell; Br. F., vol. i, p. 263.
Blenniops Ascanii,	Gunther; Cat. Br. M., vol. iii, p. 284.

This species has been known in Britain for almost a century, but so imperfectly as to have been confounded with one or two others, to which it bears but little likeness. Yet it cannot be deemed rare, for besides an example that is represented in the work of Pennant, it was found by Dr. Fleming in Scotland, on the coast of Norway by Nilsson, in Yorkshire and also at Berwick by Dr. George Johnston, by whom the specimen was communicated to Mr. Yarrell and Mr. Jenyns. It has been found also at Wick, in Scotland, by Mr. Peach, and not unfrequently in Cornwall, so that three examples have been taken there in one day. In no instance, however, have I known it to have taken a bait: a circumstance which may be explained by the fact, that while it generally keeps in deeper water than the others of the British species of its family, the narrow gape of its mouth scarcely admits of its receiving such hooks as are employed at the depth of water it frequents, and which is not commonly less than from five to seven or eight fathoms. It is worthy of notice, however, that while this is the case in Cornwall, it is found only between tide-marks in the north. It is caught not unfrequently in crab-pots, which are shot in the ground it frequents among rocks and stones. There can be no doubt but that it enters these pots for the sake of the bait; but there have been found in its stomach the worms which inhabit tubes, *(Tubicolæ,)* and also the sponge, *(Halichondria carnosa.)*

An example of Yarrell's Blenny, taken in the middle of July, measured in length seven inches and a quarter, which appears to be the largest size to which it grows. Its greatest depth, exclusive of the fins, was one inch and an eighth. The front of the head drops suddenly from the eyes to the mouth; cheeks full; lips tumid; the lower jaws a little the longest; teeth regular, closely set, and small. Eyes near each other, and high on the head; between them and the lip a slender process, and on the upper part of the head in front two elevated processes, which are tipped with a tuft of fibrils; also immediately above the eyes a pair of much longer branched processes, nearly three fourths of an inch in length, the branches being on the top and posterior border. Separate fine threads along the nape to near the dorsal fin; in a rather deep depression between the anterior and longest processes is a pair of nasal orifices. The belly is protuberant; the body compressed, and its breadth diminished but little as it approaches the tail; covered with fine scales, each marked with a pale rim of colour. Lateral lines two, the uppermost taking its beginning from a row of pores, which pass backward from the superior bound of the cheek, and it soon disappears. The dorsal fin single, even, and joined to the root of the tail; first rays longest, and the tip of the first with a double tuft of tendrils, —a slight formation of the same on the second ray,—fifty rays in all. Anal fin from the vent to the tail, with thirty-five rays. Tail round, the rays sixteen. Pectoral wide and round, with fourteen rays. The ventral fin had three soft rays, and in other examples these rays have not only varied from two to four, but the rays themselves were branched, contrary to what is found in the true Blennies, with short and heavy bodies. The colour of this example was an uniform reddish brown, lighter on the belly.

When this fish dies it is with a spasm which tends to distort the head and neck. A description and figure are therefore added of an example that was kept alive. In this condition of life it bore no inconsiderable general resemblance to the Butterfish, presently to be described, the outline proceeding straight from the eyes to the tail, and the front descending from the eyes to the lips in a circular form. When dead this example assumed a rigid spasm, and then the head was bent upward, and the tail was bent from a right line. The longer tufts between the eyes when alive appeared short, and were directed forward, but in death they became stretched up and erect. The dorsal fin was not actually joined to the tail, but the anal was united to it. The threads in front of the dorsal fin were numerous; ventral fins short. Instead of being branched like a deer's horn, the processes above the eyes were tufted like a cluster of grapes; the first rays of the dorsal fin were not particularly lengthened, and were only slightly tufted. The colours were beautiful, the general tint being pale yellowish pink. The large prominent eye encircled with a dark border, from the lower portion of which a band passed down to the angle of the mouth. Dorsal fin lighter than the body and speckled. Body with bands, mottled. A whitish dash on the upper border of the lateral line, and nine whitish heart-shaped spaces along the sides to the tail near the dorsal fin, to which they are joined by a narrow band. It proved to be a female, and when alive and at rest it had a disposition to turn its tail forward by bending the body, in reference to which habit Mr. Peach observes of an example which he kept alive, that it generally rested with its tail turned towards its head, the anal fin being laid flat, outside, on the part turned round, as if to support it. It even seemed, after a time, as if capable of being tamed; and its eyes were often seen turned in opposite directions, as has often been noticed in other fishes of kindred families. Besides a power to turn the tail on either side, it was also able to lift it up and depress it.

The difference of colour in these examples, as here noticed, cannot be regarded as marks of sex, since in a pair afterwards examined, one of which was a male and the other a female, the form and colour were closely like those of the specimen first described. In the mottled fish the dorsal fin contained fifty-one rays, the anal thirty-eight, pectoral fourteen, caudal sixteen, and the ventral three; but of the branchial rays six were counted, while in the others only five appeared.

CENTRONOTUS.

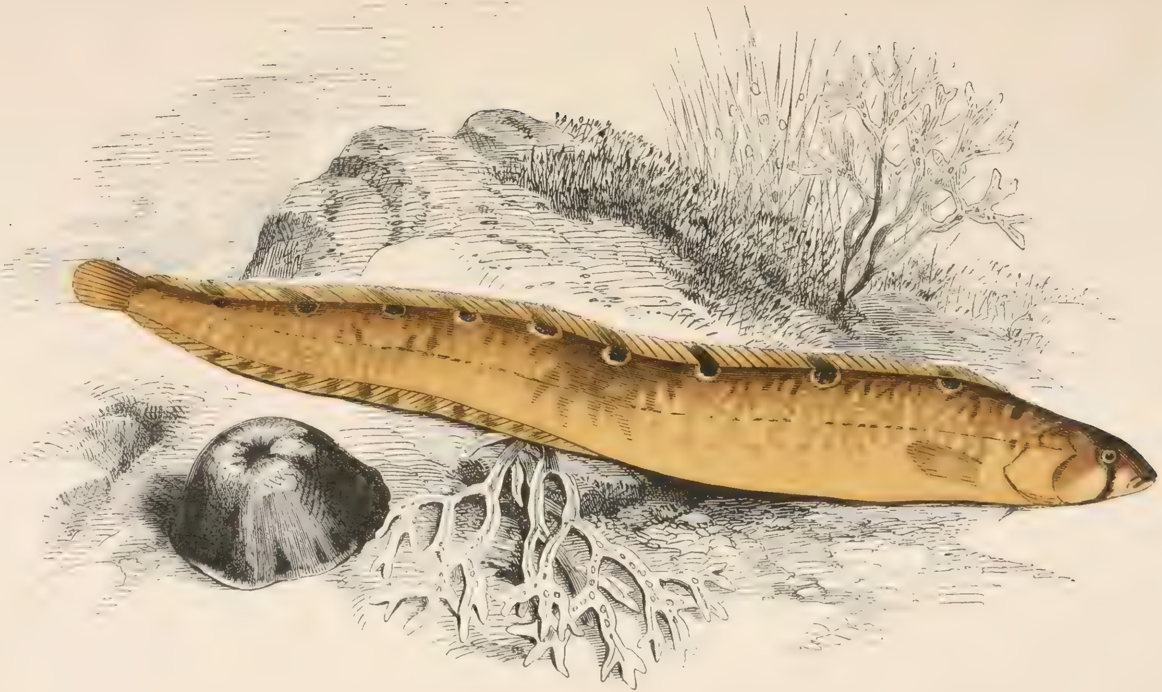
The head small; jaws equal; body long and much compressed; dorsal fin long, and with the anal running near to the tail, but not continuous with it. Ventral fins with two short rays, which are jugular.

BUTTERFISH.

SWORDICK. GUNNEL. NINE EYES.

Gunnellus Cornubiensium,	Willoughby; p. 185, pl. G 8, but the specimen figured had died in a spasm.
Blennius gunnellus,	Linnæus. Bloch; pl. 71. Donovan; pl. 27.
“ “	Jenyns; Manual, p. 283.
Blennie gunnel,	Lacepede.
Gunnellus vulgaris,	Fleming; Br. Animals, p. 207.
“ “	Yarrell; Br. Fishes, vol. i, p. 269.
Centronotus gunnellus,	Gunther; Cat. Br. M., vol. iii, p. 285.

This species receives the name of Butterfish from its very slippery skin, from which and its active wriggling, it is difficult to grasp or hold it in the hand. The name of Gunnel, by which it is usually designated in books, was assigned to it by Ray, who supposed he had found it so called in Cornwall; but the origin of this name, which, on the authority of that eminent naturalist and excellent man has been widely spread, appears to have arisen from a somewhat ridiculous mistake. As this fish was new to his inquiries, he appears to have applied for information to some one as little informed as himself, and the answer he seems to have received was that it looked like the gunwhale (pronounced gunnel) of a boat, from which casual circumstance has arisen its best-known denomination. Bloch, who had no knowledge of the English language, has given a similar explanation of the term, which therefore he probably received from a travelling friend, to



BUTTERFISH

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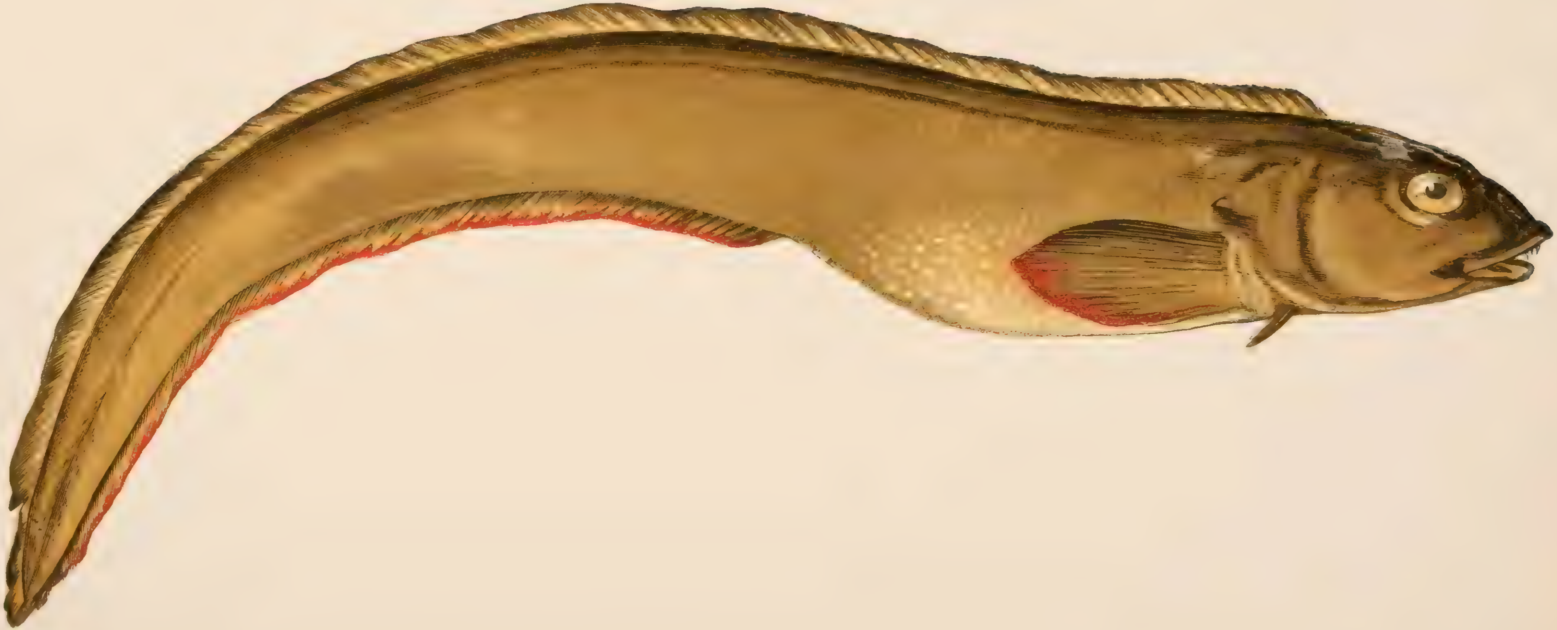
whom we know he was indebted for other information as regards Cornish natural history.

This fish is not met with in deep water, and near the shore it frequents oozy ground, especially in tidal harbours; where it keeps near low-water mark, and is often left concealed under a stone, at a few feet or yards from the border of the lowest tide. It is a native of northern climates, and is known even in Greenland, where it is said to reach a larger size than is usual in the British Islands. Nilsson says that it is found on the coasts of Finmark and Norway, down to the mouth of the Baltic, but not in the more eastward part of that sea, where it is probable the water is too fresh to sustain its life. It is also a native of all the shores of the British Islands, wherever it can find suitable shelter and subsistence; but everywhere it may be considered a solitary fish, as it is not common to find two or three together. It is said to be found also in North America, but it may be doubted whether the American fish is not a distinct species, which, however, Mr. Yarrell, on comparison of specimens, believed it not to be. Its food appears to be for the most part the smaller crustaceous animals.

Nilsson says its spawn is shed in November, but it is probable that the season holds through the summer. In the first week in June, Mr. Peach, who then resided at Fowey, discovered the grains of what there seems to be no room for doubting to be the spawn of the Butterfish, attached to the under surface of a stone in the harbour of that port, with the supposed parent near it; and with a microscope a considerable progress was rendered evident in the development of the embryo fish, as promising a speedy birth with resemblance to the supposed parent.

An usual size of the Butterfish is five or six inches in length, and the general shape is long, compressed, and of nearly equal depth from the head to the tail. The head slopes gently from the front of the dorsal fin to the mouth, where the jaws are equal; gape narrow, and opening obliquely downward; teeth regular, and some in the palate; eyes high on the head. The body smooth and slippery; vent at about half its length, excluding the tail; a slight mark of a lateral line The dorsal fin begins in a line above the border of the gill-covers, narrow, even, joined to the border of the root of the tail; anal from the vent to the root also of the tail; the last-named fin round. Rays of the dorsal fin seventy-eight, of the anal forty, the two first firm; pectoral fin moderate, round, eleven or twelve rays; ventrals very small, the rays two; the tail round. The general colour brownish yellow, sometimes mottled; a dusky line from the eyes over the gills, and one (more deeply marked) from the eye downward. A row of dark, almost black spots along the back from near the beginning of the dorsal fin to the root of the tail, each one bordered with a ring of light colour. They stretch from the back, each one over its own portion of the fin, and vary in number from eight to twelve, the two or three nearest the tail more obscure; anal fin with oblique pink bands or stripes; pectoral fins commonly yellow.



VIVIPAROUS BLENNY.

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ZOARCHUS

The body lengthened, smooth; dorsal and anal fins running to the end of the body, where they unite to form the tail; ventrals short, with three or four rays, placed as in the Blennies.

VIVIPAROUS BLENNY.

GREENBONE.

Mustela marina vivipara,	Jonston; Table 46, f. 8.
" " "	Willoughby; p. 122. Bloch; pl. 72.
Blennius viviparus,	Linnæus. Donovan; pl. 34.
Zoarces viviparus,	Cuvier.
Gunnellus viviparus,	Fleming; Br. Animals, p. 207.
Zoarces viviparus,	Jenyns; Manual, p. 384.
" "	Yarrell; Br. Fishes, vol. i, p. 273.
" "	Gunther; Cat. B. M., vol. iii, p. 295.

This is a fish of the North Sea, and is common on the coast of Scotland, as also on that of Norway and Sweden, with the Baltic Sea along its length. As we come southward it becomes more rare, and west of the Straits of Dover we are informed of only a single specimen, which was obtained by Colonel Montagu in Devonshire.

Its usual haunts are not far from the shore, where it seeks concealment and safety under a stone. Its food is generally those objects which are sought for by the other species of the family of Blennies. But what has particularly attracted the attention and excited the wonder of observers, is that remarkable variation of nature as compared with its congeners, of hatching its young within the body of the parent and producing them alive; a portion of which process and development is thus described by Willoughby, with the addition of a few remarks derived from the work of Professor Nilsson.

The males are much less in number than the females, and are also of inferior size; but they are not otherwise to be distinguished, except when the females are distended with the young. Willoughby supposes the season of fertility to be about the spring equinox, but according to Nilsson it is through the year; at which time the grains of spawn are very small, firm, and of a whitish colour; and they are seen to be contained in a bag which before had appeared empty. In a little more than a month these grains have increased in size, and are become of a reddish colour; they become more soft when as large as a grain of mustard seed, and then they assume a lengthened shape, with a couple of dark specks where the eyes are to be. The thread also is visible by which the nourishment is conveyed into the bowel; and finally the tail is seen, but not thicker than a very slender thread, and it appears bent at its termination. With the growth of the young the belly of the parent becomes more and more distended, but not solely from their increasing bulk; for what contributes to it is a tenacious fluid with which each ovum is supplied, and by which (and an attendant bed of soft fibres) the soft and tender substance of each young one is kept from pressing on and injuring the structure of the others. The thick and tenacious fluid in which the young ones float diminishes as their growth increases, and it altogether disappears about the time when they are to be produced to light, no doubt by absorption into the body, the number at one birth having been known to amount to three hundred. This would appear, however, to be the extreme limit of their number, since Nilsson says that in a fish which measured a foot in length, it amounted to one hundred and ninety-five, and in one of thirteen inches to two hundred and sixty-two. It breeds at an early age, since a fish which measured only six inches has been known to contain roe; but the number produced, and their size, have been observed to vary with the bulk and consequent age of the parent; so that the example from which our figure and description were taken, and which was a little beyond ten inches long, produced only seventy, while in some of the largest size the young ones in this first stage of their existence, measured between four and five inches; and so perfect are they at their first entrance into life, that they are immediately able to put forth all the activity of existence. Soon after the production of their young the parents are lost sight of, and probably they have retired to deeper water. They are sometimes brought to the market, but are not esteemed for the table.

This fish is of a lengthened form, which is round at its origin, but becomes compressed and tapering as it approaches its extremity. The head slopes gradually from behind to the lips, which are fleshy; upper jaw longest; the teeth conical, and not so closely and regularly arranged as in the generality of Blennies. Eyes of moderate size, towards the top of the head, but not close together. A line runs from the head along the back, and is lost as it comes near the tail. The dorsal fin begins above the border of the first gill-cover, and runs, a little waved, to form the tail, by becoming joined to the anal fin; but at a short distance from this union there is a deep notch, from which it passes on in a narrower form. The pectoral is large and round; ventrals close under the throat, small, with two or three obscure rays. The colour is a chesnut brown, lighter on the belly; some white marks between the eyes, and white dots on the belly; anal fin with a red border. The surface of the body is studded with circular depressions, which were observed with a microscope by the late Professor Quekett, and found to be formed of small round scales, each about the twelfth of an inch in diameter, of a white colour, and with a very small black spot in the middle. They are placed deep in the skin, and in some situations stand at regular distances.

ANARHICHAS.

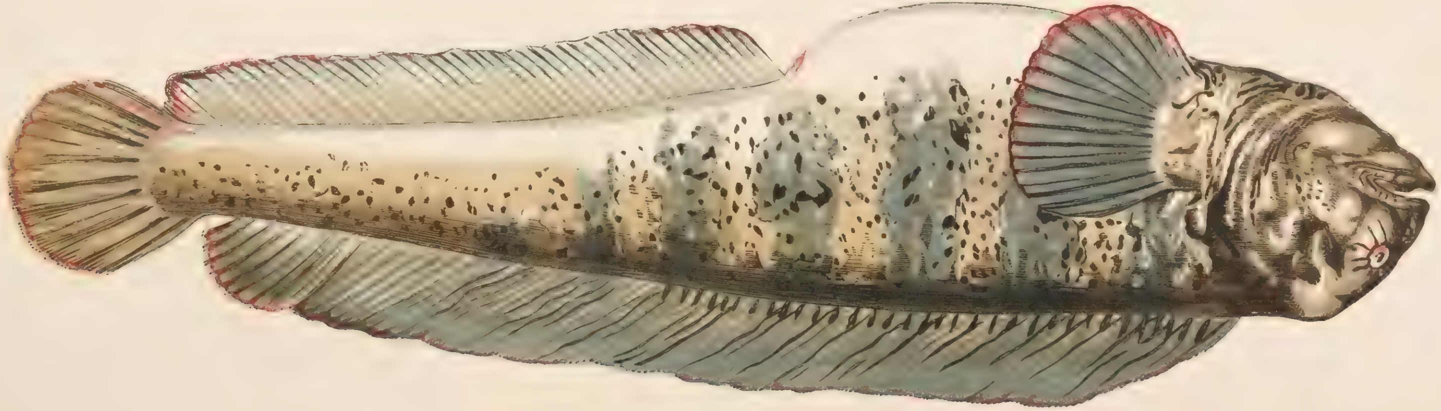
The head elevated, short, descending in front. The body more compressed; tail separate. Strong teeth in the jaws. Dorsal fin single, long, not joined to the tail; no ventral fins

WOLF-FISH.

CATFISH.

Lupus marinus Schenfeldii,	Jonston; Table 47, f. 2, but without a description. The figure copied by Willoughby, H. 3, f. 1, and p. 130.
Anarhichas lupus,	Linnæus. Cuvier. Bloch; pl. 74.
Anarhique loup,	Lacepede. Donovan; pl. 24.
" "	Fleming; Br. Animals, p. 208.
Anarhichas lupus,	Jenyns; Manual, p. 384.
" "	Yarrell; Br. Fishes, vol. i, p. 277.
" "	Gunther; Cat. Br. M., vol. iii, p. 208.

The Wolf-fish is well known in all the countries which lie on the borders of the North Sea, from Iceland and Greenland to Norway and Sweden, and the shores of Ireland and Scotland, with those of the coasts of the east of England; but it is among the rarest of fishes on the south of the British Islands. Yet it has sometimes been taken there, and a specimen is known to have been caught at Plymouth, with another at Fowey, in Cornwall. A third example was obtained at Looe within our own knowledge, and from this our figure and description were derived; a circumstance the more fortunate as we are not able to refer with confidence to a published likeness of the fish, except in the elegant work of Fries and Eckstrom, on the "Fishes of Scandinavia;" most of the others appearing to have been drawn from dried skins or such as were very indifferently preserved. In some parts of Scotland,



as well as in Norway and Sweden, this fish is not unfrequently brought to the market, where its flesh is said to be well esteemed, although its general aspect has but little to recommend it.

The Wolf-fish is in fact a gigantic Shanny, with most of the characters of the latter greatly exaggerated. It does not permit itself indeed to be left exposed by the ebbing of the tide, nor does it seek shelter in the hole of a rock; but it possesses pugnacious habits of a formidable sort, and its power to display them renders it no despicable opponent. Its eagerness for food is great. Crabs are easily crushed and swallowed. It finds but little difficulty in breaking to pieces and swallowing the shells of shell-fish, or otherwise it swallows them whole. It is said that it has been known to lay hold of the anchor of a ship, and while the bite was with a grating sound, evident scratches on the iron were made by the teeth. It was a less effort in the individual that was caught within our own knowledge, that it bit asunder a stick held to it, although as stout as a man's finger; and therefore we need not question the accuracy of Lister when he tells us that in three examples he had known caught at Scarborough, the teeth were found broken through their substance.

It swims with some rapidity, and resists with violence efforts that are made to catch it. Its time of spawning is in May and June. The people of Greenland employ its skin in forming bags and other useful articles.

Dr. Fleming appears to limit the length of this fish to about three feet, but it is said on other authority that it sometimes reaches to more than twice that size. The specimen we describe did not exceed two feet nine inches. The first half of the body stout and round, growing more slender and compressed behind the vent. Belly prominent, and the vent at about the middle of the length. Head large, elevated, with a prominence on the top, the profile descending rather suddenly to the mouth; the lips fleshy, with furrows; teeth conical, irregular, loose in their attachment. Eyes at half of the distance between the top of the head and mouth; nostrils on a prominent process. Regular furrows diverging from the eye, and numerous wrinkles on the cheeks. The dorsal fin begins a little anterior to the root of the pectoral, the first rays shorter than those which follow, the margin waved, and near its end an indentation, which may be accidental. This fin and the anal run near the tail, their termination rounded and bound down, but not actually united to the tail; this last organ round, as is the pectoral also, and fleshy, wide, extending low towards the throat, the border crenate, with eighteen rays.

The ground-colour of the head and body is dull brown, becoming paler, to white below, with numerous white mottlings and seven irregular bluish bands on the back and sides, passing up also over the dorsal fin, except the hindmost band, which is confined to the back. None of these bands are found on the body towards the tail. On the dorsal fin also there are oblique lines of dark blue colour, which run obliquely backward without being conformed to the course of the rays. The border and lower portion of the pectoral fin pink. Net-formed markings on the forehead.

RIBBAND FISHES.

The species of the family of Ribband fishes possess a general likeness of shape not inaptly represented by that useful portion of apparel; the body being long, narrow, and especially thin, with a border along the back of a lengthened single dorsal fin, and in some of the genera also with an anal fin. The tail is differently shaped and directed in different genera of this family; and in some of them, especially such as have been found in the Mediterranean, this variation might appear to have been adopted with a view mostly to give the bearer a fantastic appearance; but the peculiar actions of these fishes are but little known, and there is no doubt that a wise intention has presided over these diversified arrangements, in fitting them for the particular instinctive actions which have not yet come under the observation of man. We have followed Dr. Günther in excluding from this family the genera Lepidopus and Trichiurus, as being more closely than the others connected with the family of Mackarels; and therefore we find among the true Ribband fishes that their proper character, in addition to what is remarked above, is their having the head short, elevated, abrupt in front, with the opening of the mouth not extensive.

TRACHYPTERUS.

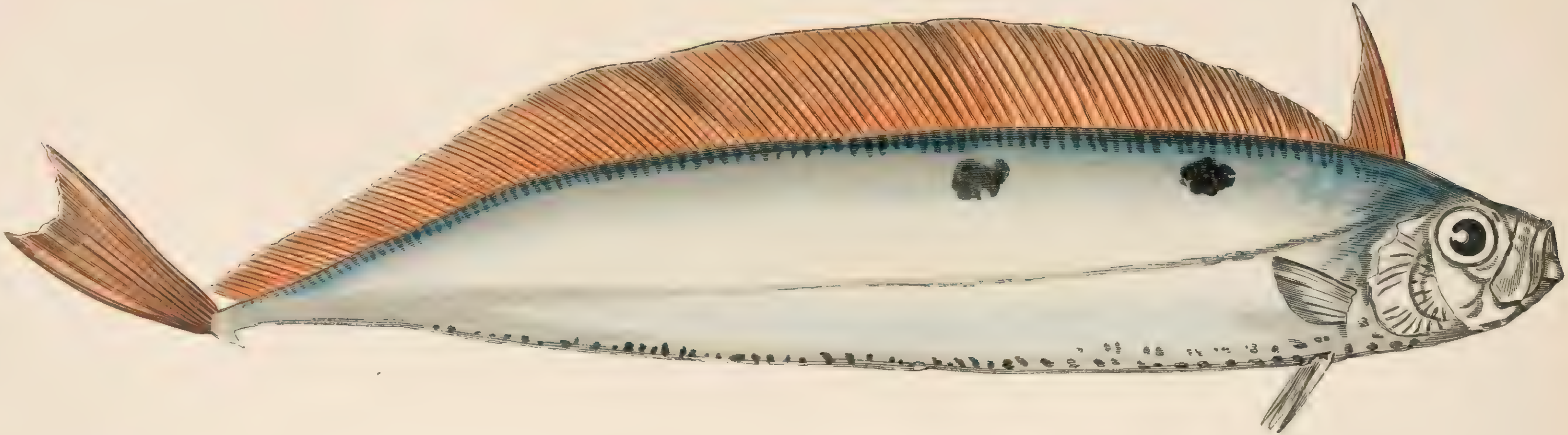
The body lengthened, very thin, naked; eye lateral, cleft of the mouth small. Dorsal fin long, with a partially separate and elevated portion in front. No anal fin; ventral fins on the throat, well developed; tail out of the lengthened direction of the body.

DEALFISH.

Vaagmär,	Loudon; Magazine of Natural History, vol. iv, p. 215, the figure by Dr. Fleming, copied by Mr. Yarrell, 1st. ed., vol. i, p. 191, but rejected for another, 2nd. ed., vol. i, p. 210.
Gymnetrus arcticus,	Jenyns; Manual, p. 372.
Trachypterus arcticus,	Gunther; Cat. Br. M., vol. iii, p. 395.

The Dealfish finds its home in the icy portion of the northern ocean, and probably in its deepest recesses; from which it emerges only on rare occasions, when it visits or is thrown on the shores of Iceland, Norway, and Finland; and our knowledge of it in the first place is due to the inhabitants of the country first named. But the substance of this fish, as of some others of this family, is so tender and brittle, that examples have rarely been secured in a perfect condition, for which reason a great degree of obscurity remained for a long time on some of its characters; and it is only within a few years that a definite description and correct representation of its shape have been obtained; so as to decide in what genus of the Ribband fishes it ought to be placed.

Its claim to be considered a British fish was first rendered certain by Dr. Fleming, on the authority of a specimen which was sent to him from the island of Sanday—one of the Orkney group; where it was caught alive, and where two or three examples had been seen within a short space of time. The specimen examined was three feet in length, but by the time it had reached Dr. Fleming, it had become so injured and broken that the figure drawn from it bears little likeness to what we now know



DEALFISH

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of it, and the description is, if possible, still more imperfect. Besides some other examples that are known to have fallen under the notice of ordinary observers, it appears from what is said by Albany Hancock, Esq., and Dr. Embleton, in their account of another species of this family presently to be referred to, that at least a couple of specimens of this fish have been obtained nearer to us than the islands of Orkney; since one which measured five feet five inches in length, that was taken on the coast of Northumberland, is preserved in the museum at Newcastle; and another is described by Professor Reid, of St. Andrews, as having been in his possession.

From the circumstance of the great rarity of this fish, and the mutilation it receives from even moderate handling, so that a specimen preserved in the British Museum is far from being in a perfect condition, our figure and the history of its habits so far as they are known, must of necessity be borrowed from writers of the Natural History of the North; among whom we chiefly distinguish Professor Nilsson, whose authority for its habits were for the most part obtained by inquiry among fishermen of his nation. It is to be remarked however that this eminent Swedish naturalist advances the opinion that there are in reality two species of what in Iceland is called the Vaagmaer, and by the Swedes Norsk-Sölv-Queite; but that they so closely resemble each other that they are usually confounded together. As it is thus possible that both these supposed species may be met with among ourselves, it is judged best to give a lengthened extract from the Swedish author's volume; and for the sake of greater accuracy to add to it the description of this fish, as given by Dr. Günther, in his Catalogue of the Fishes of the British Museum.

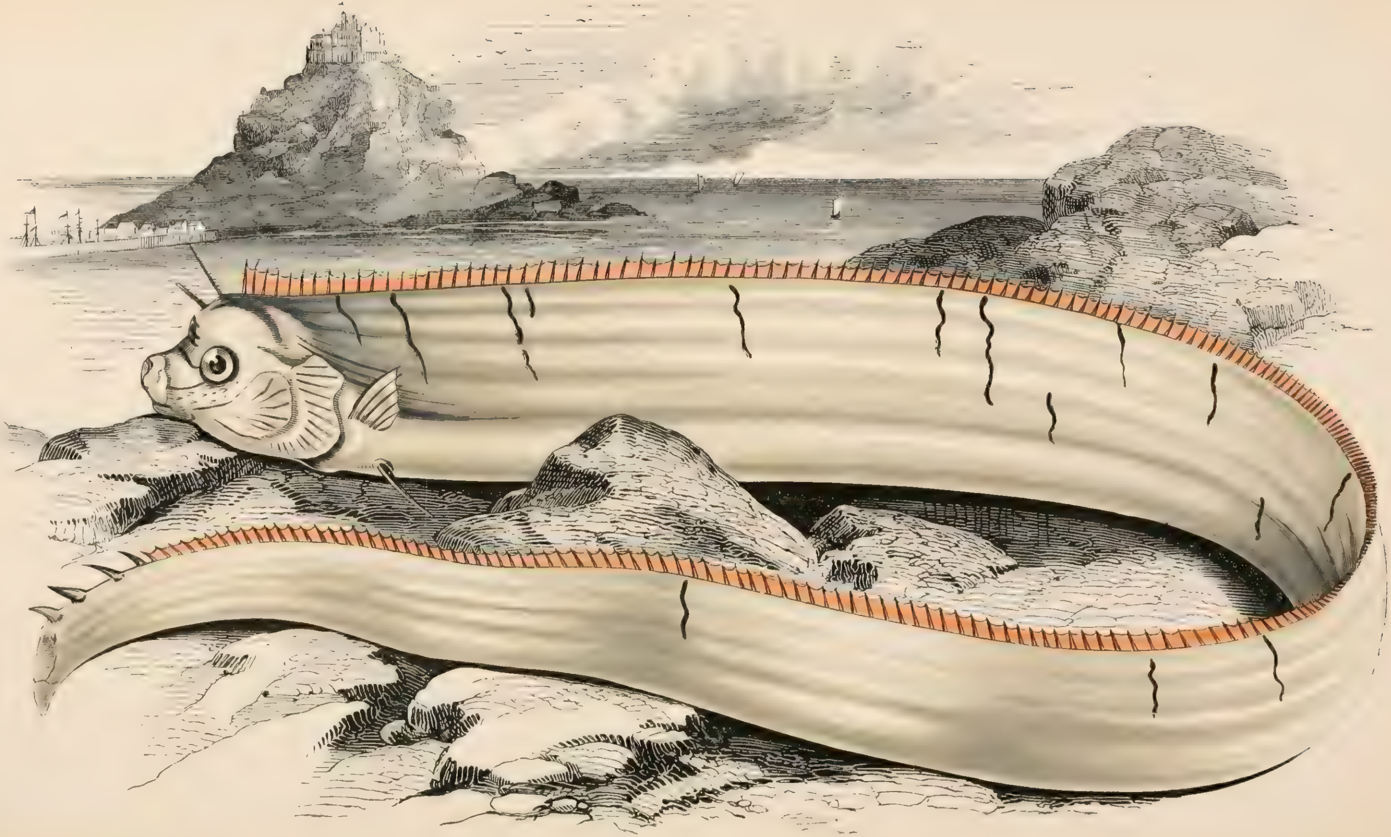
This fish, says Nilsson, approaches the coast of Finland, where it is known by the name of Sölv-Queite, or Silver-coloured Holibut; which is intended to signify that its habits are like those of the Flounder. It is rare, although most of the fishermen have met with it; and sometimes after a storm two or three examples are found to have been thrown ashore. Sometimes also in the autumn one or two may be caught in the herring nets, but at other seasons they are believed to lie out of reach in deeper water. At the season of their appearance however they are occasionally discovered as they lie quietly close to the bottom in water of the depth of two or three fathoms, where their silvery colour renders them easy to be perceived; and as their motions are slow, the fishermen experience no difficulty in laying hold of them with a hook, and drawing them up as they would a dead Seal. When they move it is something like a Flounder, with one side turned obliquely upward, and when resting at the bottom the left side is always towards the ground, (which is judged to be the reason that both sides are not exactly alike.) In all these particulars their motions resemble those of the Flat fishes, *(Pleuronetidæ.)* It is scarcely known what is their food, but it is supposed to consist of crustacean animals and mollusks. The fishermen of Finland report that when alive this fish is very fat, and its sides round; but the fat is so liquid and oily, that it runs from the body as soon as the fish is dead; and then its shape becomes thin and flat. The fish when caught are sold to the Russians of Archangel, who purchase them for the sake of the fat.

The description by Dr. Günther is thus given:—The greatest height of the body is at its central part, where it is contained five times and a half in its length, while the height at the nuchal region is nearly one seventh of the total, or equal to the length of the head. Muzzle truncated; cleft of the mouth subvertical; upper jaw very protractile. The maxillary teeth are thin, conical, and pointed, nearly recumbent, with the apex turned towards the pharynx; two on each side of the upper jaw, three or four on each side of the lower; one or two single pointed teeth on the vomer, none on the palatine bones. The superior pharyngeal bones are studded with pointed curved teeth. The eye is situated near the frontal profile, and its diameter is two sevenths of the length of the head. Interoperculum nearly as large as the operculum. The short pectoral fin is situated nearer to the ventral margin than to the lateral line. The anterior five dorsal rays are somewhat detached from the others, and appear to be produced; the rays are quite smooth, slender, flexible, without the slightest trace of transverse joints; they are dilated inferiorly into a saddle-shaped shield, with a short curved point in the centre; a number of small sharp bodies appear along the root of the fin. The vertically raised caudal fin contains eight rays, the outer ones of which are longer than the six middle ones; the two central rays are studded with minute spines. There are several rudimentary rays at the extremity of the tail. Firm papillary warts along the abdominal margin. The lateral line is armed as in *T. tænia*, and is confluent with that of the other side beneath the end of the tail: a stronger spine indicates the point of junction. The vent is situated somewhat behind the middle of the length. Silvery, with two blackish spots; fins reddish; the anterior spot is situated at the commencement of the second fourth part of the whole length of the fish, the posterior being near the middle.

The above characters have been taken from the excellent accounts of Professor Reinhardt and Nilsson; but as the latter gives a comparative description of what he supposes a nearly allied, but, as he judges, a different species, which perhaps may more closely resemble the fish described by Dr. Fleming, it is thought best to add the description given by the last-named Swedish naturalist.

The example described was sent to Lund from Tromso, by Professor Lilljeborg, and measured six feet in length from the extremity of the snout to the root of the tail; and from the former also to the hindmost border of the gill-cover nine inches; from thence to the vent forty inches. Behind the head the depth was eight inches, which increased to ten inches above the pectoral fins, and to fourteen inches at thirty-four inches from the snout, which was the greatest, and after which it suddenly slopes away backward, and at the distance of eight inches from the caudal fin it was only four inches; close in front of the tail it was only four lines and a half. The body is thickest along the middle of the sides, and thin along the back and belly; gill openings wide; the body covered with a rough and firm skin, which is studded with rough protuberances, numbering from twelve to fourteen to the inch. On the sides of the back these are large and more distantly placed, and along the sides of the lower edge of the body they form high and hard conical warts. The lateral line at first passes up to the side of the neck, and then is bent down behind the pectoral fin; behind this it is straight, but at last drops nearer to the lower border, which it joins under the root of the tail. It is formed of a row of small flat oblong and rough plates, each having a small spine at its middle, directed forward; and at the last eighth shield the spines are longer, pointed, and of the same shape and size as the saw-teeth. Again, the three or four hindmost sheaths or plates are smaller and oval; and below the last of them, or a little further back, on the lower side of the tail are two pair of spines, which point downward; the first pair, which are the largest, having a direction forward, and the others backward. At the end of the lateral line are three double spines, beyond which it does not extend, as it appears to do in the figure of the Vaagmär by Reinhardt. The dorsal fin begins at about three inches from the neck, and becomes broader until it reaches its greatest breadth at its hindward third part, where it is five inches and a half in height; from which portion it becomes narrower as it proceeds to the tail; the rays number one hundred and sixty. In front of this fin were spines or broken rays, which perhaps were the remains of a fin. The pectoral fin is low, and measured in length two inches and a half, with ten simple rays; a spine in front of it.

In the true Vaagmär, or Dealfish, there are ventral fins under the pectorals, but in the fish here described there was no mark of such; and although the part where they might be expected to be found was dissected, no signs of even the rudiments of such fins were discovered; (in which it agrees with the fish described by Dr. Fleming, as before referred to.) The caudal fin six inches and a half long, the rays, eight in number, directed obliquely upward. The eye of the left side less than that of the right. The colour of the head blackish on the top, of the right side of the head and body a glossy silver, which is removed when the skin is handled; of the left side pale grey, with dashes of glossy silver. Dorsal and caudal fins red. The two oblique oblong black spots which are on the sides of the Dealfish near the back are not seen in the fish here described; but in place of them is a black dash parallel with the upper border of the body. According to the reports of fishermen this fish is sometimes found ten feet in length. As in the figure by Dr. Fleming, the vent is represented as near the head, and the representation we derive from Professor Reinhardt displays that outlet as about the middle of the body, there seems no doubt that, taken in connection with other particulars, they apply to two different fishes; of which there is reason to conclude that both of them have been taken in the British Islands.



BANKS'S OARFISH.

CXIX

GYMNETRUS, (*Cuvier.*) REGALECUS, (*Gray.*)

THE body long and very thin; head compressed, and sloped from the top to the mouth. A long dorsal fin, the first rays of which are much elevated. Distinct ventral fins, each formed of a long filament; no anal fin; the tail with scarcely the mark of a fin.

BANKS'S OARFISH.

Hawkins' Gymnetrus, (referred to)	FLEMING; Br. Animals, p. 204.
" "	RICHARDSON; Supp. to Yarrell's Br. Fishes, p. 27.
Regalecus Banksii,	GUNTHER; Catalogue Br. Museum, vol. iii, p. 309.
" "	Annals and Mag. Nat. Hist., 2nd. Series, July, 1849.

THE characteristic habits of Banks's Oarfish in its native haunts, and even the haunts themselves are so little known, that we find the amount of its history recognised by naturalists to be limited to a mention of the places where it has been found, and the circumstances attending its capture; and even as regards the last-named particulars there appears in some of the instances no small degree of uncertainty in the accounts that have been given concerning them.

The first example on record in England is said to have been obtained at Whitby, in January of the year 1759, and of which we learn the particulars from a paper by Albany Hancock, Esq., and Dr. Embleton, in the "Annals and Magazine of Natural History" for the year 1849, where they quote the "Annual Register" of the former date; but the species could not have been recognised from the description there given, until additional light was thrown on it from the examination of other examples. There was one remarkable circumstance, however, which was noticed of this specimen, that has stamped an influence on the history of this fish as a singularity in itself, as well as that it offers an explanation of the reason why some of the published figures and descriptions are so exceedingly unsatisfactory. When handled this fish broke into pieces, as has been the case also more or less with the body or fins in every instance to the latest date, thus shewing the remarkable brittleness of its substance.

In the order of events the next example we have to notice is one which was left by the tide on the beach at the little town of Newlyn, near Penzance, on the 23rd. of February, 1788, and of which various figures have been given, with a difference of dates; although from inquiry I have not been able to satisfy myself that more than a single example has ever been met with in Cornwall. It is said by Shaw, indeed, in the remarks on the fish called Hawkins' Gymnetrus, which he has borrowed from Bloch, that he has seen a printed account in which a fish was described that he believed to be of the same species as the Gymnetrus of Hawkins, and which was also thrown on shore on the coast of Cornwall in February, 1798. This example was said to have been six feet and a half long, and six inches and a half in depth; in thickness two inches and three fourths. The body was silvery and the fins red. Our remarks from Bloch are as extracted from an edition of his work in 18mo, kindly lent to me by the late Lieutenant-Colonel C. Hamilton Smith, R.A., of Plymouth, the well-known eminent naturalist; where it is said that this fish was distinguished by a fin which is immediately over the front of the head, and furnished with several distinct processes that were formed on one extended membrane. It was also particularly marked by the fin of the tail, which in the figure is shaped as being forked. The body was sword-shaped; the opening of the gills large; the rays soft. This fish, says he, was sent to me by Mr. Hawken, (whom in another place he calls Hawkins,) from whom also I received the figure; and in his communication that gentleman informed him that the fish had been taken near Goa, in the Indian Sea, on the 23rd. of July, in the year 1788, a date which M. Valenciennes corrects by giving it as 1783. From what is now known there is little doubt that the specimen said to have been taken near Goa, and which was in length only two feet six inches, with the weight of ten pounds, was of a different species from the Cornish fish, although Bloch regarded them as being the same; and it appears further that both of them differ from a fish of the North Sea, known by the name of Ceil Coning, or King of the Herrings, and which Dr. Gunther believes to be the *Regalecus glesne* of authors, and different from Banks's Oarfish.

But some portion of the original mistake concerning these fishes must be imputed to the gentleman who made the communication to Bloch, and whom there is no hesitation in believing to have been John Hawkins, Esq., a Cornish gentleman, brother of Sir Christopher Hawkins, Baronet, and himself a competent naturalist, although not particularly skilled in the knowledge of fishes, and in this opinion of the source of Bloch's information I am supported by Shaw, who indeed gives Mr. Hawkin's own authority for the fact. This gentleman had accompanied Professor Sibthorp in his botanical travels through Greece, from whence he returned with a large collection of plants, of which however, it does not appear that he afterwards made any use. It is known also that Mr. Hawkins travelled widely over the continent of Europe, and some fruit of his inquiries in the north appeared in a communication which he made to the Royal Cornwall Geological Society on the salt mines of Poland. The pursuits and general character of Mr. Hawkins would lead him to seek the acquaintance of such persons as Bloch and Professor Pallas, to both of whom it is probable that he made such communications as supplied them with materials for their respective works.

M. Valenciennes has the following remarks:—"Thus, Russel, at the end of his account of the Gymnetre, which is named after him, informs us that a fish of this kind was thrown on shore on the coast of Cornwall in the year 1796, and that a figure of it was sent to Sir Joseph Banks." This fish is described as having long filaments in the place of ventral fins, and a plume on the top of its head; but the tail had been lost. It is to be observed, however, and in some respects not a little suspicious, that no allusion is here made to another specimen said to have been obtained in Cornwall in the year 1791, which is the date inscribed on the drawing in the possession of the late William Rashleigh, Esq., F.R.S., etc., and which furnished the original of Mr. Yarrell's figure in the first and second editions of his "History of British Fishes."

But the testimonies here given appear to point to the existence of at least a second Cornish specimen; while on the other hand we remark that at the request of Baron Cuvier, Mrs. Lee was led to make search through the manuscripts and drawings which formerly belonged to Sir Joseph Banks, and which at this time are in the library of the British Museum; and the result was, that no other drawing of a Gymnetrus could be found besides a figure of that one which was left by the tide at Newlyn, in February, 1778. Subsequently to this, on the occasion of the exhibition in London of the example caught at Cullercoats, and presently to be described, I myself made a search among the papers and drawings of Sir Joseph Banks, with the aid of Robert Brown, Esq., the distinguished botanist; and the result was the same as Mrs. Lee had represented it. A tracing was made at this time of the figure above referred to, and which is bound up with a copy of the quarto edition of Pennant's "Natural History." To this figure we shall again make particular reference; but I feel little hesitation in supposing that in the accounts of a second Cornish specimen by Shaw and Russel, their information or memory had confounded together the fish obtained at Newlyn, in 1788, with one which had been found by women on the 18th. of March, 1796, at Filey Bay, in Yorkshire. In the library of Sir Joseph Banks, there is a letter which gives an account of this last-mentioned example, which measured thirteen feet in length, and one foot in depth, its thickness three inches, and the length of the head seven inches. Along its under side behind there were rows of small tubercles of a silvery whiteness. The dorsal fin began near the head, and reached to the extremity of the body, and was of a red colour; the number of rays two hundred and ninety-three, those of the pectoral fin twelve. The vent was four feet from the snout.

It does not appear that a likeness of this example was taken; and it becomes a matter of some interest that as much as may be of the particulars which belong to the figures of the undoubted Cornish example may be cleared up, while there remains a possibility of accomplishing it: since it appears that some of these figures still exist which do not display a near likeness to each other, and yet profess to bear a close resemblance to the fish itself.

As the residence of Mr. Edward Chirgwin, a respectable fish-merchant, was near the place where the first-mentioned Cornish example was found, he was acquainted with the circumstances attending the discovery; and it was his expressed belief that the drawing of it in his possession was not only taken from nature, but the only one that was so: in which opinion however there is reason to conclude that he was mistaken. By the favour of Mr. Chirgwin this drawing was copied for my use, but the original has since come into my possession. It is somewhat roughly executed, but expresses much of the known character of the fish. Two prominent rays of the anterior portion of the dorsal fin project forward over the snout, and have the extremities expanded into an oval or fan-shaped membrane, after which the fin runs in a much narrower form to the extremity of the body. The ventral fins are formed of a pair of rays, which measure about one third of the length of the whole fish; and the end of each is expanded in the same manner as that of the first rays of the dorsal fin. The pectoral is round. The posterior extremity of the body is represented as defective, but to shew that the supposed caudal is an addition made by the draftsman, it is not closely joined to the body. The eyes large, and the jaws are drawn out in an unusual manner. The lateral line begins high on the neck, but soon descends and runs along nearer the lower than the upper outline. All the fins are red, but the body has a greenish tint, which is deeper near the border above and below; with stripes of a deeper tinge of the same colour. The inscription on this figure is, (marked with inverted commas, as if copied from some other,) "This is a drawing of a fish that came on shore at Newlyn, on Saturday, the 23rd. of February, 1788. Its length without the tail, (which it wanted) was eight feet and a half, its extreme breadth ten inches and a half, and its thickness but two inches and three fourths.—M. Wright fect."

The figure, of which I was favoured with a copy, in the possession of the late William Rashleigh, Esq., F.R.S., etc., was said to represent a fish that was taken in the year 1791; and was the original of the representation in Mr. Yarrell's own editions of his "History of British Fishes;" but I agree with Dr. J. E. Gray, in believing that the supposed date is a mistake. The inscription on it says that the weight of the fish was forty pounds, but it departs more than any other figure from the most essential characters of other figures and of Nature. Thus the lengthened rays on the top of the head are thrown aside, or transferred to the ventral fins, which are made to possess four instead of two. The jaws are unnaturally drawn out, as in Mr. Chirgwin's drawing, and a depression of the outline is represented behind the head. The added caudal fin is also represented, although with some difference, and the figure on the whole is so conducted as to shew that the imagination of the draftsman has had a greater influence on the work than the observance of Nature.

Notwithstanding Mr. Chirgwin's opinion to the contrary, there cannot be a doubt that the drawing in the possession of Sir Joseph Banks was carefully formed from the fish itself. It especially represents the natural shape of the jaws and front of the head. By an outline of the latter it will be seen that the elevated rays of the front of the dorsal fin or plume is in some degree more correctly represented than in the other drawing, but they do not possess the wide-spread extremities which are shewn in Mr. Chirwin's figure; and as experience in other instances shews them to be brittle, they may have been broken off by frequent handling.

It is a pleasure to be able to transfer our notice from these, on the whole imperfect or erroneous materials, to the more authentic account of a recent example which is given by Mr. Hancock and Dr. Embleton, and which, as we shall presently see, has also come under our own examination. The history of the capture of this specimen is thus given:—"On the 26th. of March, 1849, a fine specimen of a species of Gymnetrus, or Ribbonfish, was captured by Bartholomew Taylor and his two sons, the crew of a fishing-coble belonging to Cullercoats. It was found at about six miles from shore, and in from twenty to thirty fathoms water. The men having started from their fishing-ground to return homewards, observed at a little distance what appeared to be broken water; and on coming near the spot they perceived a large fish lying on its side near the surface. The fish as they drew near to it righted itself in the water, and came with a gentle lateral undulating motion towards them, shewing its crest and a small portion of the head above water; they struck it with a rod, to which was attached a hook, used for landing fish; on which it made off with a vigorous and vertical undulating motion, and quickly disappeared. But in a short time it again appeared, and they found it again lying on its side. A second blow tore the tender flesh, and the fish again escaped; but on coming to it a third time, the two young men placed their arms round the fish, and lifted it into the boat. When brought on shore, from rough handling, the fins had become much torn. Its colour was a uniform silvery grey, resembling bright tinfoil, or white Dutch metal, except a few irregular dark spots and streaks towards the anterior part of the body. On closer inspection the remains of a bright iridescence were seen about the pectoral fin and head, the blue tint predominating. In shape the fish presents somewhat the form of a double-edged sword blade, being excessively compressed; its greatest thickness is decidedly nearer the ventral than the dorsal border; from the thickest part it slopes to each border, the dorsal being the sharper. The length of the fish was twelve feet three inches, the mouth not being projected forward; immediately behind the gills it measures eight inches and a half in depth, and from this point it gradually enlarges to a distance of upwards of two feet further back, where it attains its greatest depth of eleven inches and a fourth, which dimension remains the same for a foot and a half, and then diminishes to the end of the dorsal fin, where the depth is three inches. At the part of greatest depth the thickness measures two inches and three fourths.

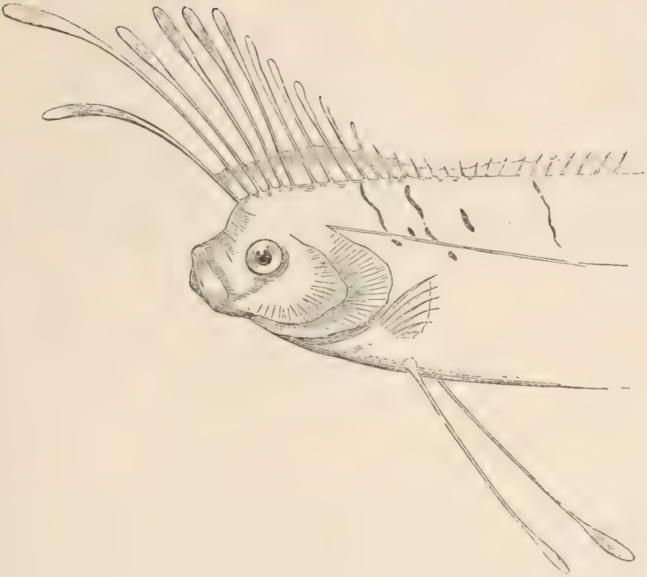
The fishermen stated that when this fish was first taken it was all over of a brilliant silvery iridescent hue, which soon faded. The skin is covered with a silvery matter, in which no scales were visible, but which is readily detached and adheres to any thing that touches it. Round the posterior margin of the preoperculum was a broadish dusky mark, and near the top of the head above the eye a crescentic mark of a dark iridescent blue colour; besides which there were on the side of the body several narrow dusky black slightly waved lines distant from each other, and obliquely inclined from before backward. Of these eight or nine were above the lateral line, and of unequal length; and below this line they were more numerous; diminishing in size on the whole until they ended in mere spots at some distance behind the vent. This lower series seemed to correspond in some measure with the upper. Interspersed among the lines were a few irregular spots. The lateral line could be traced from behind the head, gradually passing downward near the ventral border, until it became close to it at the termination. Four longitudinal flattened ridges, rather more than an inch in breadth, passed on from the head to the tail immediately above the lateral line; the uppermost, which is the longest, running forward almost to the eye. The surface of the skin was studded with numerous tubercles of bone, the smallest and most depressed being between the ridges and towards the dorsal and ventral borders; the most prominent being upon the ridges. On the ventral ridge were numerous irregular and prominent tubercles, slightly hooked backwards; and these tubercles were near the head replaced by irregular depressed hardenings of the skin.

The head was small and short, measuring nine inches from the snout to the posterior border of the gill-cover. The outline of the lower jaw formed a wide arch, convex below, and stretching forward and upward to the mouth, which was placed in an elevated position, and opened upward and forward. The mouth small, nearly circular, and capable of being thrust forward two or three inches when the lower jaw was depressed. The profile of the head from the front of the crest was at first suddenly concave, the concavity facing forward and upward, and close behind the anterior end of the concave is the small nasal chamber. Beyond this concavity the premaxillary bones projected almost horizontally to the mouth. The eye an inch and a half in diameter, and flat; the iris beautifully white. There were no teeth; the gill-covers large in proportion to the size of the head, with well-marked radiating lines. The dorsal fin extended from immediately behind the upper and posterior end of the curved frontal profile to within three inches of the tail. The anterior part of this fin was more prominent than the rest, and had twelve rays, which were stated by the captors to have been twelve or fourteen inches in length when the fish was taken, and each to have been furnished with a membranous expansion on its posterior edge, increasing in width upward something like a peacock's feather. The first ray was a rather strong spine, rising close within the frontal curve, the three next very slender and much the closest together, and when the describers first saw the fish they were united in what remained of their length by a membrane. The next was equally slender with the preceding, but somewhat further apart, and the three or four next in order were nearly as strong as the first. Those which followed diminished in strength and length, so as to become uniform with the rays of the dorsal fin. Exclusive of the crest there were two hundred and sixty-eight rays in the dorsal fin; the border of the membrane pale red. Pectoral fins close behind the gill-covers, without colour, having eleven rays, the longest measuring two inches. The ventral fins formed of a pair of very strong and straight spines, having a border of membrane; but they had been broken off at the end. No mention is made of an air-bladder; and the stomach was scarcely to be distinguished from the gullet. In it there appeared to be grains of the spawn of fish."

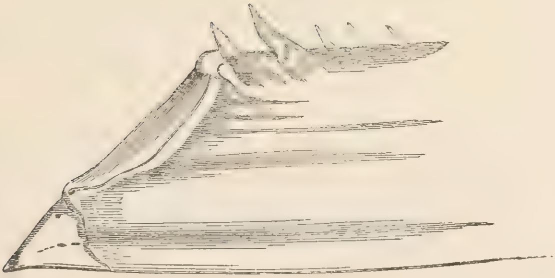
To this lengthened account it may be of interest to add, that when the fish thus described was exhibited in London, I accompanied my friend Mr. Yarrell in a privileged visit of inspection before it was laid open to the public; and that the figures I prefer to give in illustration of its history were the result of this examination; the bent form being adopted for the purpose of including its larger dimensions within the limited size of the plate. In the likeness contained in Sir John Richardson's supplement to his edition of Mr. Yarrell's "History of Fishes," the rays of the plume, or anterior part of the dorsal fin, are represented as they appeared at first to the fishermen, and as also they are marked by Mr. Hancock and Dr. Embleton, but they did not exist in the fish when exhibited; and it is preferred to give in our representation on the plate only so much as was seen by myself. The caudal extremity also is deserving of notice; for not only is there not a vestige of a fin, but a peculiar organization is found there, which appears to possess a power of some peculiarity of action. Regarding this, a note made on the spot says that from a firm or bony fixed point above, a bony curve with the concavity posterior passed to a fixed point below; and from one of these fixed points to the other was a thinner substance, which was more moveable than fish, and appeared to represent some organization which might serve as much for steering as urging forward.

Since the capture of the example of which we have thus given an enlarged account, three or four others have been met with along the north shores of the kingdom; the largest of which was obtained at Kiess, a few miles from Wick, and consequently not far from the extreme north of Scotland. I am indebted for the few particulars which are known of it to Mr. Peach, who informs me that it measured fifteen feet and about a half in length, and as being much injured about the head, probably more. This is therefore the largest we have yet heard of; its greatest depth one foot two inches, the thickness three inches and a half, and the weight one hundred and eighty-two pounds, falling very far short indeed of the famous Sea Serpent, but conveying the impression that the latter is a species of the same order of fishes.

Of the several examples which have thus been caught in Britain, or driven on shore, there seems no reason to doubt that all of them have been compelled to leave their native haunts under the influence of disease; and from the facility with which they become injured by rough handling, there is reason also for believing that they commonly reside in some of the quiet nooks or depths of the ocean, to which the violence of a storm can rarely penetrate and where therefore the brittleness of their texture cannot expose them to injury.



Head supposed as seen uninjured.



Caudal extremity.

CEPOLA.

The body lengthened, compressed, of nearly uniform breadth until near the tail. Head sloping rapidly; angle of the jaw depressed; vent not far from the throat. Dorsal and anal fins long, running close to the tail, which is continued in the same line with the body. Ventral fins thoracic.

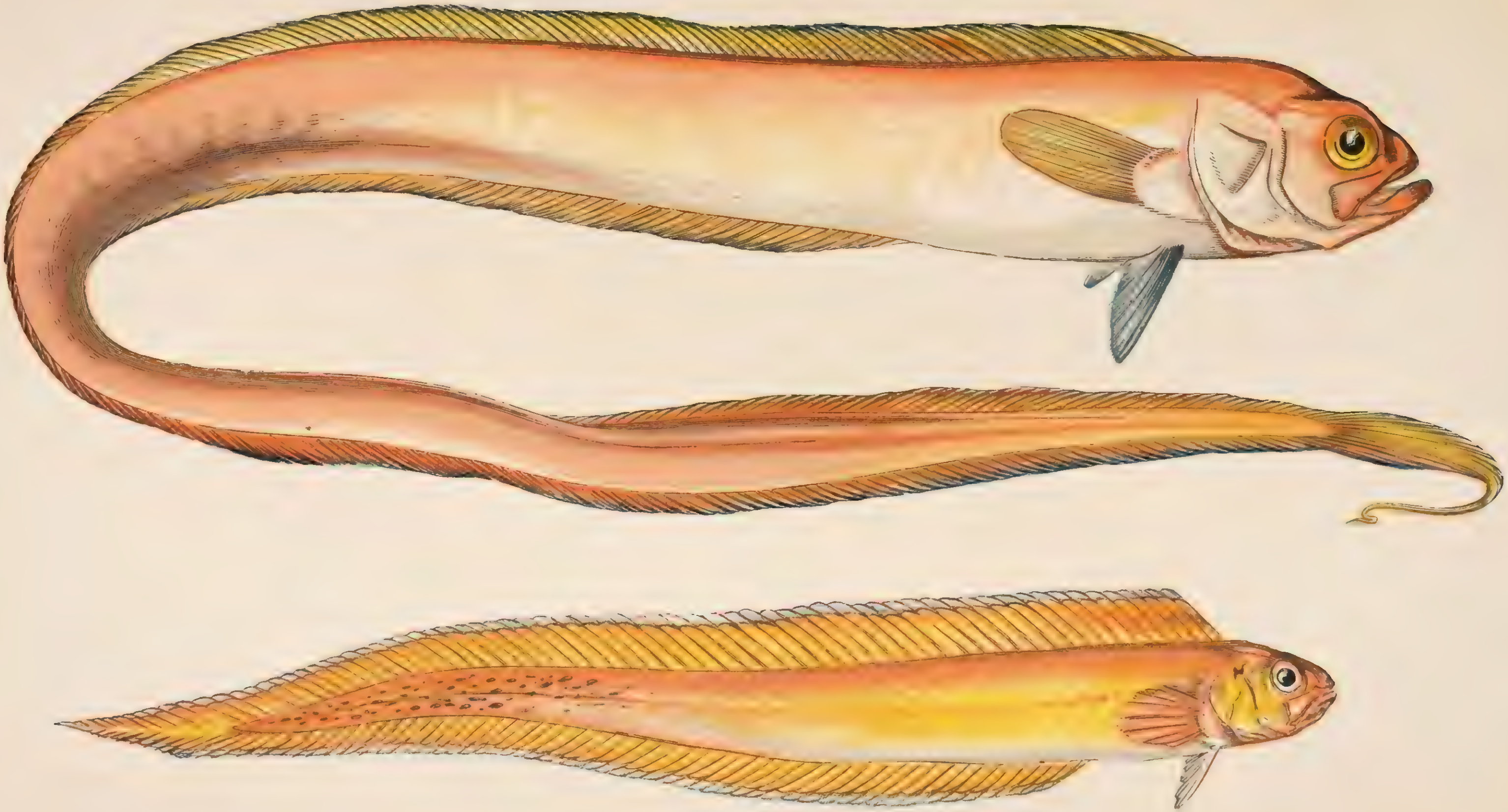
RED BANDFISH.

RED SNAKEFISH. RED RIBBANDFISH.

This species appears to have been known to the older writers on Natural History; but the figures they give of *Serpens rubescens* and *Tænia* cannot be regarded as representing this fish. If also our Red Bandfish be the *Cepola Tænia* of Bloch, the figure of this author is a poor representation of it.

Cepola rubescens,	Turton; Linnæus. Cuvier.
" "	Donovan; pl. 105.
" "	Fleming; Br. Animals, p. 204.
" "	Jenyns; Manual, p. 374.
" "	Yarrell; Br. Fishes, vol. i, p. 224.
" "	Gunther; Cat. Br. Museum, vol. iii, p. 486.

This fish was first made known as British by Colonel Montagu, at the beginning of the present century, from two specimens which he had obtained on the south coast of Devonshire; but since his day, no doubt from an increase of observers, it has been found far from rare, and examples have come to hand on almost every part of the shores of the British Islands, even to the extreme north of Scotland. Mr. Thompson records specimens from different parts of Ireland. It has been taken near Ayr, and Mr. Peach has seen it near Wick: but still it is more



RED BANDFISH, AND VARIETY

CXX

common on the south and west of England, although the occurrence anywhere of thirty specimens at one time, (Loudon's Mag. Nat. Hist., N.S., vol. ii,) must be deemed remarkable. It is also remarkable that the occurrence of this fish in numerous instances has been owing to the accident of its having been thrown on shore by stormy weather; from which it happens that, although not liable to be broken in pieces, like the larger members of the ribband-shaped family, it usually becomes disfigured with a variety of bruises. Some have been found on opening the stomachs of the more voracious fishes, especially of the Cod family; and in a few instances it has been known to be caught with a hook. From circumstances attending its capture with us, it appears that its habits are to keep in rocky ground at a moderate depth of water; and that its food is the smaller sorts of crustaceans and perhaps mollusks, which the relative capacity of its gape enable it to seize with readiness, and which the spreading direction of its teeth must assist to retain with firmness. The stomach is of moderate size, but of a firm and muscular texture; and it may be added, in reference to its internal structure, that the air-bladder is large, with its chief portion not situated in the common cavity of the body, but behind it, and stretching along from the spine to the neighbourhood of the anal fin.

The Red Bandfish is common in the Mediterranean, and Lacepede gives a florid account of its motions when alive, as if he had seen them; although when he informs us that there are two species, now acknowledged by naturalists to be only varieties of each other, he makes a principal distinction between them to be, that the *C. serpentiformis*, which is the true *C. rubescens* of Gmelin's Linnæus, is furnished with a forked tail, which certainly is not the case. The short account by Risso of the actions of this fish is more moderate in its tone. He says that with its smooth and flexible body it is able to move in a serpent-like manner with considerable activity; and in contrast with the pale blue water, its own brilliant red colour has procured for it the name of the Flame and Ribband.

The greatest length of this fish has been about twenty inches; but the example described measured fifteen inches, with a depth, including the fins, of an inch and a quarter, gradually tapering from the vent to the tail, and very thin. A specimen of small size has been seen nearly round, but another, only four inches and a half in length, was equally compressed with the larger individuals. The head slopes in front from behind the eyes, which are large and lateral. Angle of the mouth depressed, the gape considerable, mystache wide; teeth scarcely regular, long and sharp, expanding from the jaws. Lateral line obscurely marked, but visible by the insertion of muscles; and along the root of the dorsal fin a row of small bony processes. No scales visible on the fore part of the body, but discernible near the tail. The dorsal fin begins from above the gill-covers, and continues of about the same breadth until near the tail, where it becomes narrower, as does the anal fin from the vent; and both are united to the caudal fin, the root of which is well marked and distinct; the form of this fin long-lancet-shaped. Pectorals round, reaching more than half-way to the vent; the belly being but of short dimensions. The dorsal fin has seventy rays, the anal sixty; tail with twenty rays, those of the middle in this example two inches long, and on the side less than a fourth of that length. Ventrals thoracic, pointed, the rays fastened down with a membrane through half their length.

The colour of this fish is usually a brilliant red or scarlet, which is deepest on the back; the belly pale. In some instances the dorsal, anal, and caudal fins are much more extended than in others; and then they are marked with stripes of much beauty, so that the appearance of the fish has countenanced the opinion that there is more than one European species. Such a one is described by Rafinesque, under the name of *C. marginata*, but the figure he gives is below contempt. The following is a description of this variety of the Bandfish:—the example eleven inches in length, with the general form of the species; the breadth of the dorsal and anal fins remarkable, and the extremity of the caudal fin lengthened out into a thread. The dorsal fin begins anterior to the border of the gill-covers, fourth ray longer than the three anterior rays. Body covered along its posterior portion with deeper purple-looking scales, which do not touch each other. Pectorals begin under the second ray of the dorsal, broad and round. Upper portion of the head and jaws red, on the sides pale yellow. Ventral fins and belly pearly white; pectorals pale red. Membrane of the doasal and anal fins pale yellow, with red rays, and a light purple border.

Red tints also on the anterior portion of the dorsal, and a thread of bright red runs from one ray to the other, thus separating the yellow portion of the membrane from the outer border; middle rays of the tail bright yellow, outer rays red, bordered again with a wide stripe of pale purple. In some instances these lengthened stripes of yellow, red and blue, or purple, are more strongly marked, and well defined; in some also the general red colour of the dorsal is marked with deeper patches of red; and a drawing was shewn to me by an eminent naturalist, and marked with the name of *C. Tænia,* in which a wide separation was shewn between the dorsal and caudal fins; but on examination of the original specimen, which had been preserved, it was evident that the displacement had been caused by an accident. There seems therefore no reason to doubt the correctness of Cuvier's opinion, that there is only one European species of *Cepola.*

END OF VOL. II.

B. FAWCETT, ENGRAVER AND PRINTER, DRIFFIELD.